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Management Accounting in the United States-2

Excerpt from Productivity Report on Management Accounting by the Anglo-American Council on Productivity

In the February issue of the Bulletin there was presented one section of the report of the Specialist Team on Management Accounting of the Anglo-American Council on Productivity, which visited this country during May and June of last year "to find out what accounting, costing and statistical information is provided for American Management at different levels: by what method it is obtained and how it is used".

The section presented dealt with the team's general survey. There is offered below, again with the permission of the Anglo-American Council on Productivity, the section of the report dealing with American Costing Methods.

Introduction

1. "Cost consciousness" is the outstanding feature of the American industrialist. He seldom makes any decision of importance without comparing the cost of the proposed action with its expected financial results. This does not simply mean cutting costs, though if he can do so without prejudice to the quality of the product or the future efficiency of his factory he certainly will. It also means not missing opportunities. He will just as readily embark on large-scale and ambitious expenditure if the rewards for doing so appear sufficient.

All the other features that have been cited as the outstanding attributes of American industry really spring from this root. Standardisation, planning for long runs, high-pressure sales campaigns, even the much envied productivity, all result from the determination to produce at the lowest cost possible so as to maintain the competitive position of the concern. Productivity in terms of output per man-hour is not an end in itself, but the means to the end of cost-reduction. Mechanisation, in factory and office, likewise is the answer to the

problem of achieving low costs in spite of high wage levels; mechanisation is considered from the angle of its effects on the cost of the final product, not from any abstract idea of increasing productivity.

2. With such a cost-conscious management, naturally, the industrial accountant has been called upon to play a great part in the management of American industry as adviser and counsellor, and the managers are often carefully trained in the use of the figures their accountants prepare. The accountant in turn has developed a conception of service to management. Whether he comes straight from a college training in accountancy, or has spent some years in "public accounting"—the equivalent of our professional offices—as soon as he enters industry and becomes known as an "industrial accountant", his one aim is to serve management. He designs his whole system of records and reports to this end. The record-keeping function is also considered in the light of checking on performance rather than merely as the means to the production of the annual shareholders report.

3. This whole trend in American industrial accounting is summed up in the development of the office of "controller"—a distinctively American feature. The nearest approach to the controller in Britain is the chief accountant, but there are sufficient differences between the responsibilities of the respective offices in the two countries to justify the different titles. More is expected of the controller, and he demands more of himself and his staff. While the most progressive accountants in Britain are moving towards the same position, in American industry the average industrial accountant seems to have reached it already.

4. An appreciation of this development in American accounting practice is necessary for an adequate understanding of the contribution of accountancy to industrial efficiency in the United States. It is true that British accountancy literature contains already the principle of all the techniques in use in the United States, and this Report can do no more than indicate some of the particular applications that have proved effective, but to take no account of the personal factor in the preparation and use of figures is to overlook the determining factor in the effectiveness of the accounting branch of American companies. Therefore before going into a detailed recital of particular applications, some of the characteristics of the attitude of American industrial accountants are noted.

Service to Management

5. The controller recognises that his primary function is to serve management, and therefore he takes care to know and understand the problems that the various

managers are facing. He does not, of course, pretend to be able to solve the problems of production or marketing, but he knows their nature and so can discuss in detail with all levels of management the financial implications of the solutions they suggest.

6. He is not content merely to supervise the production and interpretation of the routine reports. He is constantly making special reports on particular subjects, either on his own initiative or at the management's request.

7. His personal touch with the management is very close, and so he gets into the way of thinking in its terms. His approach to figures therefore is to look ahead rather than back, and he is developing the techniques of preparing a forecast.

8. There is a definite change in the emphasis from recording the past to anticipating the future. Naturally the recording function still goes on, but the controller now goes beyond the mere interpretation of the past to the use of the historical record to check that forecasts are reasonable and accurate. This does not mean that the practice of budgetary control is universal, but there is a definite trend towards forecasting as the means of control, and even those companies which have not developed budgets or forecasts still take care to make the comparisons with previous periods in such a way that the trend can be clearly revealed.

REPORTS

9. Another product of the close personal touch between the controller and the management is the preparation of the reports in the form and language most suitable to the individual receiving them. The controller is always careful to see that the relevant points are emphasised, and his language is the language of the recipient. Accounting terminology has no pride of place. This personal service means that there is little degree of standardisation in the cost control forms, expense classifications or reports even within an industry. The only standardisation is in branches of the larger concerns, and even in this field the standardisation applies only to the regular returns necessary for the general control and the preparation of consolidated accounts. The local controller is given a free hand in preparing special reports as required for submission to local management.

10. Close working with the managers has produced in the controllers an acute consciousness of the time factor in the submission of reports. They are prepared to sacrifice book-keeping accuracy in order to get quick results. While the safe-

guard of exact arithmetical balancing may be abandoned and the last cent or even dollar is not accounted for, greater skill is required to maintain the necessary degree of precision to reveal trends accurately.

11. The speed with which the problems of management change has made the accountants flexible in their design of systems and reports. They have no hesitation in changing their whole routine if they think it will enable the preparation of more suitable returns. Many of the companies visited said that although their present routines were satisfactory they were preparing to change them because they foresaw that changes in the market conditions would require different information to enable management to make the right decisions.

12. Certain companies operating a system of budgetary control use long-term budgets for determining the standard costs of the different products, and prepare short-term budgets as often as quarterly or even monthly to control the day-to-day operations.

Accounting Organisation

13. All these developments have had their effect on the organisation of the controller's department. As with routines and forms, there is no standardisation in the organisation of this department, but a general pattern is discernible in different firms.

14. At the head is the controller, supported by two sectional chiefs in charge of the costing and of the accounting. The functions of the costing section are interpretative, and it is responsible for the preparation of control reports and the ascertainment of product costs. The accounting function covers the recording of actual expenditures and income, and the preparation of financial statements.

15. As the interpretative and recording sections both are responsible to the controller, there is generally no division between "cost records" and "financial records". The accounting system is planned as an integrated unit; the costing section uses the departmental details, while the accounting section requires only the expense or income totals.

Types of System Used

16. The lack of standardisation apparent in reports and organisation applies also to the method of costing. The usual dual purposes of the costing routine are there—the production of statements for the control of current operations and the ascertainment of product costs—but practically every method of achieving these ends was seen. There are companies which use historical costs by calculating

a range of product costs based on the current period's expenditure, and at the other end of the scale there are companies operating extremely detailed systems of budgetary control linked with standard product costs. In between there are many hybrid systems. One company visited operates a system of marginal costs. So the range is comprehensive. The companies using standard costs as the basis of their product costs are slightly more than half of those seen, and many of the companies using the current expenditure as the basis for calculating product costs, use standards of performance expressed in quantities as the basis of control of day-to-day operations. It is safe to say, therefore, that companies using some form of standard as a guide to efficiency predominate in number, even though only a little more than half use systems of "standard cost control" in the form generally associated with this title.

17. Certain points of practice are common to all companies investigated regardless of the type of system used. The classification of expenses follows departmental lines, and is carefully coded according to a "chart of accounts". Great stress is laid on the use of departmental accounts, because it enables reports to be prepared to show managers or foremen how the expenditure under their control is going. This is the accountant's contribution to the policy of decentralisation of responsibility which appears to be a general tendency in American industry.

18. The coding of accounts according to a standardised chart also permits a greater degree of mechanisation of the routine, but its most significant benefit is in the preparation of summarised financial statements from the detailed departmental statements used for control purposes. The code numbers generally have a dual aspect—one, the expense classification; the other, the departmental aspect. For example, one part of the number will indicate that the expenditure is chargeable to "direct labour", the other that it has been incurred in a certain department. Thus, when the time comes to prepare a summary profit and loss account, expenditure is aggregated according to the expense code and the departmental reference ignored. For speed certain companies have designed the documents of original entry to give group totals for different classes of expense, and these summary figures are posted to general ledger records even before the detailed charges are posted to the departmental control statements. In this way it is possible to get a quick picture of the ovreall results, to be followed later by statements which show the contribution of the individual departments to the final result.

19. This is one of the great advantages of the integration of all accounting functions under the controller. It also has the advantage of relating cost to

profitability, and prevents the isolation of the cost-finding function from the financial results of costs.

20. Accounting periods are often of four-weekly duration. One company has developed a special calendar designed to give the same number of working days in each month, and squared to the normal calendar by putting the extra days into the holiday month of August, which was not comparable any way.

21. Shorter term control of operations generally is not based on cost figures, but relates only to quantitative controls such as daily scrap reports, material consumption reports, output per hour, and operator efficiency reports in which actual performance by individual operators is compared with standard times allowed.

22. While the diversity of system is great, four main groups may be discerned, and the points considered worthy of note are detailed according to these groups, as follows:

(1) Historical costs used for current control and for product costing;
(2) Historical costs used for current control, product costs based on standard costs;
(3) Standard costs used to control current operations, and the same standards used to calculate product costs;
(4) Standard costs used to control current operations based on short-term budgets, and long-term budgets used to calculate product costs.

HISTORICAL COSTS THROUGHOUT

23. All systems are naturally based on a historical record of the actual expenditure incurred in a stated period. The feature that puts a system into the category of "historical" is the application of the actual expenditure in any period to the products made in that period to establish a cost of the product either for inventory valuation purposes, or for the measurement of profit per unit.

24. Examples of such systems occur both in process industries and machining industries. Generally speaking no unqualified example of "actual expenditure costing" exists, because it has been found necessary to spread certain items of indirect expenditure, such as repairs, on an estimated basis because some periods would be undercharged at the expense of others. The nearest approach to pure historical costing is in certain firms in the heavy steel making industry. In the companies using such systems the actual expenditure is charged up to each process, and the cost of production calculated on this basis for charging to the next succeeding process. But even here the charge for repairs and certain operating supplies is made on an estimated basis to get an average charge for a whole year. It is for reasons such as these that the phrase "actual costs" has been avoided. After all, as one controller said "Accounting is only approximation". The more skilled

an accountant is, the nearer he gets to an accurate record of the actual expenditure in a period, but he would be a bold man who would claim that this record of the expenditure incurred in the relatively short period of a month was sufficiently accurate to establish the "actual cost" of the products made in that month.

25. In the steelmaking companies all the products of one department are not costed separately because of the immense variety of quality and type involved, but the actual expenditure is charged to groups of similar products, and these group product costs form the basis of inventory valuations and analytical profit and loss statements.

26. One company using this method realises that the costing of groups of products is only of use for watching trends, and is not a sufficiently accurate guide to the salesman in fixing prices. In this case special studies are made from time to time to give detailed costs of every product within a range, assuming normal conditions. One such study covering 6,000 products took eight months to complete and during its preparation had to be constantly revised to give effect to price changes. The ordinary routine reports were not sufficiently detailed, and special studies had to be made by the technical staff to give the cost department the necessary information.

27. In a heavy engineering company the same problem is overcome by maintaining a file of punched cards for the cost of every part and every operation involved in assembling the product. Two men are constantly employed on keeping every detail up to date. In this way it is possible to tabulate the current cost of any of the company's products in a very short time. Such tabulations are made only when called for, and always include the figures for the previous report for comparison, thus showing the effects of price movements.

28. In engineering companies the practice of charging actual expenditure in a period to the products, jobs or batches made in the period is often abandoned when it comes to overheads. These are generally charged out on the basis of an assumed normal rate of working, and either a predetermined machine-hour rate or percentage on labour is used. The actual overhead expenditure in the period is carefully compared with that recovered in costs or, as it is sometimes called, "earned burden". In this way the adequacy of the predetermined rates is controlled. In most of the examples seen any "burden under-absorbed" on account of low volume is written off in the monthly profit and loss statement.

29. In companies restricting their accounting to historical records of expenditure, control of current expenditure is generally exercised by comparing expen-

diture in the current period with that in the previous period. In certain cases the results of a previous record month are used and in one case the average monthly expenditure in the previous year is also given.

30. In process industries the cost per unit of production is used at an additional control figure, and in one such case the individual plant managers have worked out "bogey costs" to serve as targets for the departmental managers.

HISTORICAL COSTS FOR CURRENT CONTROL: STANDARD PRODUCT COSTS

31. Two examples of such a system were seen, but the following notes are a summary of the highlights of one of them.

32. Current expenditure is controlled by a series of monthly "controllable cost reports" in which the actual expenditure for the month is analysed to departments, and within departments to appropriate heads of expenditure, e.g., direct labour, different classes of indirect labour, supplies and expenses. The current month's results are compared with the monthly average of the previous year, the results of each of the last three months, and the total for the year to date.

33. There is a considerable number of these reports as one is prepared for each section chief dealing with the expenditure under his control, and progressive summaries are made for each higher step in the line of command, until the final summary shows the expenditure for each of the eighteen major divisions in the company's organisation. These eighteen divisional totals form the expense analysis in the monthly statement of operations (a profit and loss account) submitted to the directors. In this way expenditure is reported according to the person responsible for it rather than according to the type of expenditure. A summary according to type of expense is of course prepared also for publication in the annual shareholders' report.

34. The company manufactures heavy engineering products, and a representative product comprises several thousand parts. The cost of one product is the sum of tens of thousands of different costs. The problem of finding—and keeping—an accurate cost of such products is considerable and this company has solved it by calculating a series of standard costs.

35. The foundation of the standard costs is the standard instructions known as production work orders which have been prepared by the technical staff. These instructions give details of the materials and machines to be used in making parts and of the parts to be used in sub-assemblies and final assemblies. They also determine the labour hours and machine hours allowed in the manu-

facture. These are the same except in those processes where one operator controls more than one machine. These quantitive standards are converted to dollar costs by the application of the appropriate prices for materials, and rates for labour and "burden". As the cost for each part and assembly is recorded on a standardised form under the headings of material, labour and "burden", it is possible to get the aggregate cost for the final product under the same limited number of headings. For greater accuracy, material is subdivided under several headings, and overhead is analysed under the headings of overhead recoverable on labour hours and overhead recoverable on machine hours. This simplified analysis of the elements of cost is useful in adjusting the standard cost to current cost, as will be explained later.

36. The prices and rates used in determining the standard costs are those which ruled at 1st January, 1947. It is necessary, therefore, to establish how much current prices and rates have moved since then in order to get correcting factors which will bring the standard costs into line with current conditions. This is done by establishing a series of "variances" or percentages which express the current price or rate as a percentage of the standard. These variances or percentages are then applied to the standard cost to correct it to current conditions.

37. The procedure used to establish the variances involves the analysis of current expenditure according to type of expenses, under appropriate readings for material, labour and overhead. It will be appreciated that this analysis cuts across the departmental analysis, which is made for control purposes as outlined above, and is in effect the aggregate of all similar expenses in every department. Each account is further analysed to give the standard value of the charge, which, related to the actual charge, gives the variance.

38. The number of variances computed depends on the experience of price fluctuations. For example, there are some forty different material variances summarised to give average variances for seven major groups. For the purposes of a routine check on the profitability of each group of products, monthly statements are prepared of the standard cost of the products corrected to current conditions by the application of the average variances for the seven material groups, and the variances for labour and overhead. If the danger signal appears in any product, a more detailed study is made using the particular variances for each of the forty different materials. In this way it is possible to find the current cost of a product in less than an hour.

39. The method of adjusting the overheads has been simplified. When the standards were set, a detailed study was made and every item of expense was

allocated to the various machines on an appropriate basis. The different totals were used to establish a scale of "machine burden units". In effect this scale is a guide for weighting the recovery of overheads against those products using the more expensive machines. In this way all the clerical labour involved in maintaining detailed allocation records to create current machine-hour rates is avoided, and the work reduced to finding the current cost of a "machine burden unit" by dividing the aggregate for machines in operation into the total expense recoverable on this basis.

40. Certain overheads are recoverable on the basis of labour, and in both machine and labour overheads variances are taken out to enable quick ascertainment of current costs as outlined in the case of materials.

41. If the technical staff change the production work order for any part or assembly, because they have found a more suitable method of production or better materials, the standard cost is altered. In making the alteration the prices or rates used are still those that would have been in force at 1st January, 1947, and not the current prices. This is necessary to prevent distortion of the variances which would be caused by the continual alteration of the base as new practices were introduced in the factory.

SAME STANDARDS FOR CURRENT CONTROL AND PRODUCT COSTS

42. As in the above case, the technical staff lay down standard practices for the operation of the various processes, whether steel making, rolling, machining or assembling, and determine standard outputs of the various products or processes. On the basis of these performance standards, the cost department determines standard product costs by applying standard prices for materials and rates for labour. These standard product costs are then used for valuing work-in-progress, and for determining the cost of sales in profit and loss statements.

43. By crediting the production departments with the standard cost of their production, whether it is only a machined part or a sub-assembly, these departments are put in the position of having, as it were, a fixed selling price. In other words, they are made to sell to work-in-progress at a fixed price called the standard cost. If their actual expenditure is more than the standard value of their production—i.e., the quantity produced multiplied by the standard cost per unit—they have to account for the loss, and likewise they have to explain the profit if their expenditure is less than the standard value of production. Because the standard consumption prices and rates are fixed in the light of past experience

and estimated future performance and so are to a certain extent arbitrary, the accountants have fought shy of saying that excess expenditure over standard is a real loss, and so they have defined such excesses or savings as "variances".

44. The companies using this system exercise control of current operations by watching these variances, and analysing them carefully to show to the persons responsible for creating them the monetary effects of their efficiency or lack of it. Some examples of such control systems are given below.

45. By taking all purchases of raw materials into stock at the standard price and transferring the difference between the actual price paid and the standard price to a "Material price variance account" it is possible to see whether the purchasing department is achieving the standards set.

46. Similarly by charging an account for material usage with the actual quantity used valued at the standard price, and crediting it with the standard quantity allowed for the production achieved, again valued at the standard price, the balance on the account shows whether the manufacturing department concerned is achieving the standard set for material consumption or whether excess scrap is being incurred.

47. In the same way the effects of changes in labour rates can be isolated from variations in the man-hours consumed in production, and as it seldom happens that the same person is in charge of negotiating labour contracts and of the actual operators, this is an advantage, enabling closer control to be exercised over the different responsibilities.

48. "Burden" or overhead expense is controlled in the same way by budgeting for the total expected expense and expressing it at a rate per hour or unit of production, using the planned production as the basis of expected output. A refinement is to establish various rates for various levels of production, or as they are sometimes called "flexible budgets."

49. People who work with a system of standard cost control will recognise the above description as a simplified explanation of the usual form of such a routine. They will also recognise its advantages in enabling the aggregate profit or loss to be analysed according to the different departmental profits or losses contributing to it.

50. One interesting result was noted in a company using such a system. The manufacturing department incurred considerable excess expenditure in processing off-standard material. The excess appeared first in the manufacturing department,

but the controller, after investigation, charged it to the purchasing department. Armed with the information, the purchasing department claimed against the supplier, showing him the cost to the company of his failure to meet the specification. The supplier paid compensation, but said the specification was too strict and demanded an increase in price for future supplies which would have rendered the material uneconomic. Accordingly the research department was put on to the problem, and succeeded in evolving an alternative process resulting in a cheaper product—a significant chain of events arising out of an adequate system of cost control.

51. During the recent inflationary spell the companies using this system have run into trouble, because the people controlled by it have argued that the standard prices or rates are no longer attainable, and therefore are not reasonable measures of efficiency. The companies have recognised that this argument is justified, and rather than abandon the advantages of the system, they now tend to revise the standards more frequently, e.g., once a year. This prevents the standards getting too far out of line with current conditions.

SHORT- AND LONG-TERM BUDGETS

52. In essence the companies which have developed this type of routine are working to the same principles of standard cost control as outlined above. The technical staff lays down reasonable standards of performance in given conditions, and from these the cost department develops standard product costs, which in turn are used to establish forward estimates of expenditure within the various operating and administrative departments. As the actual expenditure is incurred it is compared with the budget, and the excess or saving revealed is used as the control figure.

53. The principal difference between companies using short-term budgets and companies using the usual form of standard cost control is in their approach to rapid price changes. Rather than let the control standards get out of touch with current conditions, more and more companies are preparing short-term budgets covering periods of six months, three months, and even as short as the next month ahead. Where such short-term budgets are in operation it is general to leave the standard product costs unchanged for a year and use them for valuing work-in-progresss. The difference between the long-term budget, on which the standard costs have been calculated, and the short-term budget, which is used for control purposes, is taken into account in forming the short-term budget. In other words variances are included in the short-time budget.

54. An interesting application of this principle was seen in an engineering concern where every year two budgets are prepared. One is based on the "standard volume", or the average normal on one-shift operating. The second budget is based on the "index volume", which is the probable volume for the current year. In both cases rates are worked out to give operating and product costs.

55. This company has introduced a "super burden" in addition to the normal burden, to recover the expenditure on special tools, engineering expense and the expenses of the styling section. Engineering expense covers the cost of the departments involved in developing and determining the method of production, as distinct from the departments planning the actual flow of production. The styling section develops the design and appearance of the products. By means of this "super burden", these special expenses can be recovered in relation to the expected life of the model rather than in relation to the period of production.

MARGINAL COSTING

56. As already noted, one of the companies visited operates a system of marginal costing which it describes as the Direct Cost Accounting Plan. As used by this company, this plan is a development of the standard cost control system. The essential difference between the direct cost accounting plan and the usual form of standard costs is simple but important. The difference lies in the definition of expenses that are admitted as chargeable to the individual product costs. In the direct plan all expenses incurred in the provision of facilities (e.g., building, rentals and rates, plant depreciation, stand-by charges, etc.) or in the provision of the minimum establishment of management and staff necessary to be able to start manufacture on demand, are excluded from the product cost. In other words, the individual product costs are limited only to such expenses as are directly incurred in manufacturing, selling and distributing the particular product.

57. Although this difference appears to be mainly one of classification of expense, it has important effects on income statements. By limiting the inventory valuations to the direct expenses incurred in manufacture, the whole of the fixed charges are written off each month; no portion of the overheads is carried forward in stock valuations. This in effect radically alters the basis of the measurement of profit month by month, especially if a company's production and sales are not running in line with each other.

58. The income statements are different from the usual profit and loss account; the gross sales are charged with the direct selling expenses and with the standard costs of sales which, by definition, are limited only to the directly chargeable

items. This produces a gross margin and against this gross margin are then charged the actual fixed charges—including (a) indirect factory expense; (b) factory variances; (c) administration expense; (d) research expense—to give the final net profit or loss. The factory variances are treated as a fixed charge, although it is admitted that theoretically they are applicable only to the direct expenses chargeable to the standard product cost. However, in the company's experience the variances are so small relative to the total expenditure that it is simpler to treat them as a fixed charge.

59. The difference between the direct out-of-pocket manufacturing and selling expenses and the gross sales is known as the "merchandising margin" and is looked on as the products' contribution to the total fixed charges and profit. The merchandising margain on each unit of sales is the amount of new cash that each sale brings into the business.

60. It is argued that the allocation of the fixed charges to the individual products is bound to be inaccurate, as it can be achieved only by assuming estimated volumes of production and sales. Further, a cost including an allocation of fixed charges may be misleading to the salesmen in trying to fix prices. The asssumed volume of production may result in the total cost being so high that a price based on it would put the product out of a competitive market, while the freedom to fix a lower price might produce an increase in volume sufficient to recover the total fixed charges, although the amount recovered per unit would be less.

61. However, the company recognises that there must be some guide to the salesmen to prevent prices being fixed at levels which will not recover the total fixed charges over the whole of the company's production. Accordingly the total fixed charges actually incurred in the past twelve, eighteen, twenty-four and thirty-six months are averaged, and the running average expenditure is then allocated to major product groups on the basis of the comparable running average of the aggregate standard costs of the products manufactured. In order not to delay the presentation of monthly reports, these running averages are based on expenditure up to the end of the previous month only, and so can be calculated and entered in the reports before the closing of the books for the current month.

62. The above notes only cover the control of product costs and prices. The day-to-day control of manufacture is effected by the calculation of variances in the direct expenses. The indirect expenses are controlled by comparing the actual monthly expenditure against budgets fixed for each department.

63. The direct cost accounting plan is similar to many marginal costing schemes in operation in this country.

Control of Profitability

64. Most of the routines outlined above have primarily been concerned with the control of cost of production according to a determined policy. But cost is not the only factor in profitable working. The cheapest article is not necessarily the most profitable, and practically every company visited prepared statements showing the amount of profit or loss earned by the different products. As already indicated, some companies are content to compare the margin on groups of products month by month and confine detailed studies to those groups where the profit falls below a predetermined level. In one small company operating a job-costing system, a daily check on the profitability is obtained by putting a selling value on a report of the work done, which is made by the production manager. Against this is charged an estimated cost of material and labour, and standard charges for factory and general overheads, pensions and selling expenses. This report is available within twenty-four hours. In this company the job-card not only covers cost, but shows the selling value also.

65. Most of the companies using standard product cost systems are content to use the product costs as their guide since now most of them are revising the standard costs annually. One large company, even though it uses annual revisions, applies the variances thrown up by the monthly control reports to the products and gives detailed reports of the profit or loss on every product made each month.

66. Such reports are used to guide the sales force as to which lines to push and which to restrain, within the possible limits determined by commercial policy and the need to maintain good customer relations.

67. Control of profitability, however, is basically a long-term operation, and depends to a great extent on sound judgment in fixing prices. Most companies maintain that prices are fixed by competition and not in relation to their own costs. Within limits this is true, but the lower limits tend to be fixed in relation to cost. The average reaction to a lower price quotation by a competitor is to say "if he can do it, so can we", and to set the designers and engineers to work to find out ways and means of reducing costs to get profitable working at the lower price. In this work the controller's staff is used to clothe the technical estimates with dollar values.

68. The main method of long-term control is by detailed forecasting based on market research. The technical aspects of building these forecasts are dealt

with elsewhere in the report, but in every case where forecasts are used the controller's staff develop financial budgets from them and these in due course are used to control current operations. This practice of forecasting is not limited to companies using standard cost procedures. One company which had reduced costing work to the minimum still developed six-monthly projections, which not only covered expected costs and profits, but forecast the detailed working capital at the end of each of the next six months. The company's manufactures have a seasonal market, and these projections are most useful in negotiating with the banks for the advances needed to finance work-in-progress.

69. Another company projects in detail the production of each of its products over the next twelve months. These projections are revised monthly and the agreed production schedule for the next month becomes the authority for all sections to make the necessary purchases of materials and to hire the necessary labour. The controller's staff use it as the basis of their projected profit and loss accounts and balance sheets. The longer-term projections are likewise translated into financial terms and used to make arrangements for covering the financial requirements of the company.

70. As such long-term forecasts can be translated into financial terms only by using current prices or rates, their main use is in developing trends and studying the effects on profits of anticipated changes in volume. This aspect is well understood by the American industrial accountants. It has already been noted that more companies seem to prefer the preparation of successive short-term budgets to the preparation of a series of variable budgets, but that is only another way of recognising the important effects of varying levels of operations on costs and profits. Generally speaking, the analysis of expense under the headings of fixed, variable and semi-variable groupings is limited to the companies using some form of standard cost control of current operations. One company, however, which is currently enjoying the advantages of a seller's market and maximum volume is trying to anticipate changed commercial conditions by establishing such analyses so as to be better able to fix competitive prices in the days ahead.

71. The use of break-even charts in this field is understood and is the subject of considerable study in industrial accountancy circles. Such charts are not by nature frequent reports and are only prepared on the basis of long-term estimates. Accordingly not many were seen in the course of the survey, especially as they provide highly confidential information, but there is no doubt that the individual controllers have prepared them in many cases. In one company with several divisions working on products of different natures, charts are available for each

division and show surprisingly wide variations in the break-even points for the different divisions.

Speed of Preparation of Returns

72. A point has been made of the speed with which the industrial accountants make their returns to enable management to take quick corrective action. In many cases the controller considers the gain of a few days justifies the use of estimates to enable prompt closing of accounts. Details of the actual practice of one company are given as an indication of the methods used. This company operates the process type of production involving the transfer of the costs of one department to the next, and its costs are based on the expenditure incurred in the period. Further, the actual production departments are served by large-scale service departments producing steam, electric and hydraulic power, etc., all of which have to be charged to the producing departments. This involves a chain of cost transfers, since the costs in the finishing departments cannot be determined until the costs of the service and earlier process departments have been established. In spite of these difficulties all cost returns are completed by the third of the following month, and operating profit and loss accounts (i.e., gross results before charging selling, administrative and general expenses) are available by the fifth of the month. This is a considerable achievement, and a summarised statement of the methods used follows hereunder.

73. All cost distributions are completed by the end of the first day. To enable this to be done, accounts payable, freight and inter-departmental charges, other than services, are accumulated and distributed daily. Plant services, such as steam, water, electricity, etc., are metered, and meters are read on the second last day of the month—the last day's consumption is estimated. The rate is estimated by the plant accountant, and any over- or undercharge is cleared through an inventory adjustment account.

74. Labour distributions are made to an accumulation payroll at the end of each payroll period. For the period between the end of the last payroll period and the end of the month, actual hours are accumulated daily, and earnings, including bonus pay, are calculated and distributed to the accumulation payroll on the first day of the succeeding month. These figures are actual, excepting that an estimated rate is used for the bonus production for the last day of the month, and any adjustment (which is very small) is included in the succeeding month.

75. Cumulative figures are given for the "year to 1st inst.", i.e. the total of all previous months. In this way it is possible to have all cumulative and comparative figures entered in the statements before the end of the month.

Comparisons for Control Purposes

76. It has been indicated that trends are used widely as a means of control, and in many cases comparisons are not limited to comparison with the same period last year, or with the previous month. Instead, the figures for each of the last three months are often given. This applies equally to firms using standard cost routines and to companies using historical costs only.

77. Another type of comparison used for control purposes is between the performance in different departments of the larger concerns. It seldom happens that each of the divisions or departments operates under exactly comparable conditions. To overcome this, one company bases the comparison on the cost of production of one comparable product which is made in all divisions, ignoring all other products. Another company prepares a profit and loss account for each division under standardised headings. The volume of money in each case is not comparable because of differences in the volume of operations, so every item is reduced to a percentage of the net sales. An additional refinement is the starring of the best performance under each head, and so a healthy rivalry exists to see how many "firsts" each department can get.

Forward Planning

78. The outstanding feature in American industrial accountancy is the attitude with which the accountant approaches his job. His primary object is to serve management and as a result he has developed an intimate knowledge of the technical and commercial aspects of its problems. He approaches the accounting process with the idea of producing control figures rather than historical records, and tries to anticipate the problems that will face management. He is increasingly, therefore, dealing with forecasts and budgets to provide the basis of preventive rather than remedial action. Because he thinks in terms of personal service to management he designs his reports and routines to meet the individual requirements of the management rather than a standard of theoretical accounting perfection. Similarly, in order to get timely returns he prefers speed with reasonable precision to absolute accuracy with delay. The changing problems of management have made the accountant flexible in his approach to systems, and he readily scraps his existing routine or standards if he feels he will get more suitable and relevant results.

79. There is no standardisation in the type of system the American accountant uses. Control is based almost equally, in the sample surveyed, on standard costs as on costs developed from actual expenditure. There does seem, however, to

be a preponderance of companies using forecasts and budgets for control purposes, even though the forecasts or budgets may not be used to calculate standard costs.

80. In determining long-term policies the accountants are called in to translate estimates of future production into profit and loss statements; and in certain cases the analysis of expenditure into fixed and variable has been developed fully to enable a better understanding to be obtained of effects of variations of volume on profit and loss accounts.

81. The principal lesson the British industrial accountant can learn from his American counterpart is that his first job is to serve management, and he must review all his routines and reports to see that they achieve this end.

82. It is clear that the accountant who will be most useful to management is the one who can forecast the financial implications of alternative policies; in this way he will make the most effective contribution to industrial efficiency by spotlighting trouble sufficiently far ahead for management to be able to make a more intelligent choice and so avoid it.

"Up-to-the-Minute" Costs for Management Planning

by I. WAYNE KELLER

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To price, determine upon the best operating level, and keep the product line in trim are not easy tasks with both prices and labor rates again on the move and with the prospect of an unprecedented level of combined civilian and military demand. Under these conditions, developed costs can be worth little or they can be invaluable to management. In short, it is a tactical situation. The present author addresses himself to practical measures for its solution.

FORTUNATELY, WE ARE NOT in the expressive stage of inflation. However, the pressure created by mounting costs and "voluntary" price freezes generate pricing problems which are extremely troublesome. The movement of prices of some commodities in the past few months is startling. On top of these marked increases in the costs of basic raw materials, some companies have had two increases in wage rates within the past six months and are faced with others, to say nothing of increased related costs. Construction costs are mounting, as are machine tool costs, both tending to reduce the return on investment for expansion, cost reduction, or product improvement. In an effort to restrain this upward trend, the Economic Stabilization Agency announced on December 19, 1950 that any price increases after December 1, 1950, which are in excess of those that would be permissible under certain standards "will be regarded as subject to action by the Agency at the earliest feasible time."

The first standard was:

1. "Prices may not be increased by any manufacturer or industrial producer whose net dollar profits before taxes are equal to or in excess of its average net dollar profits before taxes in the period 1946-1949, except as provided in the following standard."

This order places a floor under profits before taxes, but increases in taxes have already been legislated, further increases are certain, and a retroactive excess profits tax has been enacted. Thus, profits before taxes must be well above 1946-49 levels if the stockholders and proprietors are to fare as well as they did in that period. In this environment, informed decisions of management are at a premium and the demands for cost information call for the most astute and imaginative application of our costing techniques.

Tactical Considerations Are Foremost

Before we discuss the development of costs for management planning, we must answer the question, "Planning for What?" A broad and long-range answer would be, "To meet civilian and military requirements and earn a satisfactory return on the money invested in the business." Obviously, that objective goes far beyond the area of decisions which are made on the basis of up-to-the-minute costs. It involves the strategy of business and calls for long-range forecasting and economic analysis. We want to take the shorter, closer-up view in the area of the tactics of business management and the decisions and plans which management makes in dealing with current operating problems. In this area, decisions must be made on problems of pricing, production planning, product selection, inventory management, by-product and joint product valuation and utilization, etc. It is for this short-range planning that up-to-the-minute costs are needed. Hence we shall limit our discussion to tactics and, for the most part, pricing tactics.

Now, what costs shall be used for this planning? By Executive Order, manufacturers were ordered to retain their cost records for the period of May 24 to June 24, 1950. Suppose during that period a company used rubber from inventory which had been purchased at $.20 per pound. The rubber it took into inventory during the period had an average cost of $.26 per pound. It had firm orders placed for near future delivery at $.27 per pound, the spot market price ranged from $.28¼ to $.29¼ per pound and, before December 1, the market touched $.75 per pound. What was the cost of rubber to be used in setting sales prices?

Here, we are face to face with the problems encountered in developing up-to-the-minute costs. Our conventional actual or standard cost figures are meaningless as a basis for management planning. We must *develop* the figures which are to provide the background information, and they must be developed by product lines, for the second standard of the E. S. A. announcement of December 19 states:

> 2. "As to an individual material or service sold by a company whose net overall profits are running above the general earning standard as set out above, the price of such particular product or service may not be increased if it is being sold at a profit. In case of a particular material or service which is not profitable, the price may be increased but in no case by more than (a) the amount necessary to make it profitable or (b) the amount of the increase since June 24, 1950, in the cost of direct wages and materials going into this product, whichever is lower."

Fluid Cost Situation Best Coped With By Standards

Such development of the cost to manufacture will be much easier if standard costs have been in use. To illustrate, let us assume that management needs the

cost of rubber tile at November 8 material prices and wage rates. Thus, if standards have been set for the units of raw material required to make a component part or finished part, any applicable material cost rates can be applied to these units. Also, the standard allowances for scrap or spoiled work will indicate the extent to which the costs of material entering into a unit of production must be increased to arrive at the up-to-the-minute material cost of the finished article. In Exhibit 1 we have the development of the material cost of 100 square feet of rubber tile at current market prices of rubber. If standards were not in use, it would be necessary to trace through the actual cost records, determine the actual quantities of material used per 100 square feet of finished tile and then apply the current market prices to those quantities. The availability of standard units eliminates one time-consuming step—a most important factor when management is pressing for the information.

RUBBER TILE

Direct Material Cost Per 100 Square Feet

	Quantity	Standard Cost		11/8/50 Market Cost	
		Per 100	Amount	Per 100	Amount
Natural Rubber	50 lbs.	$ 20.00	$10.00	$ 75.00	$37.50
W	2	100.00	2.00	110.00	2.20
X	20	1.00	.20	1.00	.20
Y	18	10.00	1.80	12.00	2.16
Z	10	5.00	.50	9.60	.96
Batch	100 lbs.		$14.50		$43.00
Per 100 sq. ft. @ 120 lbs./c	100 sq. ft.		$17.40		$51.60
Scrap - 4%	4				
Finished Tile	96 sq. ft.	$18.13	$17.40	$53.75	$51.60
Add 4% for experienced deviation from standard				2.15	
				$55.90	
Carton		.30		.50	
11/8/50 Market Cost		$18.43		$56.40	

EXHIBIT 1

Current direct labor costs can also be developed with the least effort by applying current wage rates to the existing unit time standards. Thus, assuming an increase of ten cents per hour in labor rates, we have in Exhibit 2 the development of the current labor cost of rubber tile. Here the increase in the base pay rate results in a proportionate increase in the premium earnings, and this is calculated in detail. Had the wage increase been a percentage rather than an amount per hour, the current cost could have been developed by increasing the standard direct labor cost by the percentage of increase and then adjusting for experienced deviations.

The development of current factory expense costs is much more difficult, for here adjustments must be made for the deviations from standard costs expected because of expense material price changes, wage rate changes, production efficiency, and production volume. This calls for a detailed adjustment of each component of expense in each work center, giving full consideration to the fixed and variable elements in each. Exhibit 3 shows the computation of a current cost for the calendar operation. From the current cost per machine hour the calendar rate per 100 square feet of tile can be computed on the basis of experienced yields per hour. Similarly, the expense standards of the other operations can be adjusted to arrive at the total current expense cost which, when added to the current material and labor costs, will give management the total current factory cost to be used as a basis for deciding whether or not a price increase is necessary.

RUBBER TILE

Direct Labor Cost Per 100 Sq. Ft.

	Man Hrs. Per 100 Lbs.	Standard Cost Per 100 Lbs. Base Rate	Base	Incentive	Total	Costs at 11/8/50 Rates Per 100 Lbs. Base Rate	Base	Incentive	Total
Compound	.06	1.40	.084	.013	.097	1.50	.09	.014	.104
Mix	1.25	1.60	2.000	.220	2.220	1.70	2.125	.234	2.359
					$2.317				$2.463
	Per 100 Sq. Ft.	Per 100 Sq. Ft.				Per 100 Sq. Ft.			
Per 100 Sq. Ft. @ 120 lbs./o					$2.78				$2.96
Calender	1.00	1.50	1.50	.15	1.65	1.60	1.60	.16	1.76
Vulcanize	.90	1.65	1.485	.175	1.66	1.75	1.575	.185	1.76
Cut and Square	.25	1.20	.30	.06	.36	1.30	.325	.065	.39
					6.45				6.87
Scrap 5%					.27				.29
					6.72				7.16
Inspect and Pack	.45	1.50	.675	.125	.80	1.60	.72	.13	.85
Total Per 100 Sq. Ft.					$7.52				$8.01
Deduct .5% for experienced deviation from standard									.04
11/8/50 Cost Per 100 Sq. Ft.									$7.97

EXHIBIT 2

Adjustment of Manufacturing Costs Has Many Angles

In presenting the information, the effect of volume should be shown very clearly. If this is not done, a price level may be set which will be quite inadequate if volume declines. In the illustration, the reduction in unit cost resulting from actual activity in excess of the established expense absorption volume, which was set at the average for a business cycle, almost offset the increased cost per hour. Thus, while the current cost is estimated at $10.51 per machine hour, it would be desirable to price on the basis of normal volume at current prices or $11.47 per hour—or at least as near to that rate as competition will permit. It goes without saying that we cannot expect capacity levels of opera-

tion to offset unit cost increases indefinitely. There will come a day of less than capacity operation because of material shortages, lack of purchasing power, or some other reason. The price structure should, therefore, be sound at a normal level of activity.

Another important point to note in the illustrations is that expense rates were developed per machine hour and not as a percentage of direct labor. In my opinion, this method should be followed wherever possible. Then, from engineered standards of units of production per machine hour or from average experience if standards are not used, the expense can be determined per unit of production. This may require somewhat more calculating than the percentage-of-labor method, but the benefits of a machine-hour rate far outweigh the dis-

CALENDER OPERATION – EXPENSE COST

	Standard Cost			Cost at 11/8/50 Rates		
	Fixed	Var. Per Hour	Total	Fixed	Var. Per Hour	Total
Salaries	$1,000	—		$1,100	—	
Indirect Labor	500	$1.00		550	$1.10	
Maintenance Material	400	.50		440	.55	
Maintenance Labor	300	.50		360	.60	
Supplies	100	.10		120	.12	
Depreciation	400	—		400	—	
Space Cost	300	—		300	—	
Power Cost	200	.40		200	.43	
Total	$3,200	$2.50		$3,470	$2.80	
Expense Absorption hours per month – 400.						
Rate per Mach. Hour at Exp. Abs. Vol.	$8.00	$2.50	$10.50	$8.67	$2.80	$11.47
Actual Average Hours per month – 450.						
Rate per Mach. Hour at Act. Av. Activity				$7.71	$2.80	$10.51

EXHIBIT 3

advantages of a few more calculations. It is evident from the illustrations, and I can state from experience, that expense costs do not change in direct ratio to changes in labor costs, even when the level of activity does not change. The application of archaic expense rates to direct labor costs has caused many an otherwise fine costing job to be more misleading than helpful.

The use of rubber tile as an example of the development of up-to-the-minute costs may raise the question as to the amount of work which would be necessary to do this when the product line is made up of numerous individual products. If this is the case, certain specific representative items should be selected for developing the current costs. These should have approximately the ratios of raw materials, direct labor, and factory expense to total factory cost which the entire product line has. From time to time, changes in overall mix-

ture and disproportionate changes in the elements of cost will make it necessary to change the specific products used for developing the indicative costs. From these "sample" products, adequate cost information can be obtained without the excessive effort which would be required to figure every item.

I have dealt at length with the adjustment of standard costs to current costs to meet the exigencies of drastic cost change experience, because the illustrations and procedures serve a broader purpose than to show only the techniques involved. They help to answer the question, "What is cost?". Throughout the discussion of the illustrations, the term "current costs" is used. This is a dangerous and misleading term adopted here for the needs of exposition and should never be used in actual practice. Referring back to the prices of rubber, it is possible that the rubber actually being used on November 8 cost sixty cents per pound. To use that figure as a guide for management's planning of prices would have been most misleading when it would cost $.75 per pound to replace the rubber used. Yet both figures were "current costs." Also, the span of time covered by the term "current" varies considerably in the minds of different persons. Therefore, costs should be specifically identified as to date, market price, rates actually paid, etc. And, they should specify the level of activity on which they are based. All of the foregoing can be done if standard costs are not in use, but it can be done better and faster with standard costs.

Nonmanufacturing Costs Must Be Adjusted Too

Distribution and administrative costs must also be adjusted to current price levels and to current activity levels, if they are to be useful as a guide to pricing. Moreover, they must be assigned to product lines. This latter step is necessary at all times because each product line is, in actuality, a business in itself. It has its own distribution and administration problems and its own competitors. To assume that each line can be priced so as to make the same contribution to total distribution and administrative expense and profits as all other product lines is dangerous. It can be fatal.

Furthermore, the second E. S. A. standard deals with product lines and, therefore, it is essential that a company know if a product line is profitable or unprofitable. Looking to the future, it is possible that the "net overall profit" standard will be found to be unsatisfactory because of the extensive diversification of many companies. It is not likely that E. S. A. will give favorable consideration to price adjustments of individual materials or services if only gross margin, the contribution to distribution and administrative expense and profit, can be substantiated. There are many management decisions which can and

should be made without having total product costs, but not decisions as to pricing and profit planning.

In determining these types of costs by product lines, I would use the budgets or the estimates of such costs for the period in making the assignment to product lines and then adjust the figures to current cost levels by classes of expense, in somewhat the same manner as was done in the illustration for factory expense (Exhibit 3). The objective is to develop rates of distribution and administrative expense per unit of product sold, not percentages of sales dollars, factory cost, conversion cost, or other shifting base.

A few examples should suffice to indicate the methods which can be used to develop distribution and administrative costs per unit of product. The sales force is budgeted as a certain number of men and each is either assigned to the selling of a specific product line or is under instructions from the sales manager to devote a percentage of his time to the line. From this plan for the application of selling effort, which must exist if an effective sales job is to be done, time ratios can be determined by product lines. These permit the direct application of salaries to product lines or the apportionment in ratio to effort. Travel expenses can follow the time factors used for the salaries of the salesmen. General sales management and district office expense can also be assigned in ratio to the planned application of effort of the sales force. Likewise, experience and planning will indicate the amount of sales service required in such areas as credit, billing, and statistical analysis. Advertising is, for the most part, beamed at the promotion of specific products and the cost should be so assigned.

Research and engineering development are likewise directed along product lines and the costs should be assigned to these specific lines, with overhead of these functions following the time of the men working on the projects. Personnel department costs can be assigned on labor hours or numbers of employees. As a basis for assigning the salaries and expenses of the executives of the company, i.e., the cost of top management, the amount of capital employed in producing and selling a product line, the total assets it is using, can be adopted. This basis of assignment is selected on the premise that these executives are managing the money invested in the company. The greater the investment, the greater will be the risk and the problems and cost of management.

After the planned expenditures have been determined by product lines, they can be related to the sales forecasts to arrive at the unit costs which will be added to factory costs to establish the total cost used as a basis for pricing. From the work papers used in making the assignment to product lines, the basic

data are available for cost adjustments to reflect changes in salary levels, travel costs, advertising space costs, etc. Also, changes can be made for changes in plans, for changes in sales volume, and for changes brought about by extraneous circumstances such as strikes, material shortages, competition, or even government controls. Thus, the distribution and administrative cost rates by product lines can be brought up-to-the-minute at any time with a minimum of effort.

Internal Reporting Service on Cost Changes

Coincident with the establishment of the techniques for determining up-to-the-minute costs for pricing should be a plan for keeping abreast of cost changes and for reporting the total unit costs to management for consideration. It may be possible to secure raw material prices from market quotations published by trade papers and services. If these are not available, the purchasing department should secure frequent quotations from vendors and pass these on to the cost department. Often a combination of the two methods will be needed, the first for basic raw materials and the second for semi-processed materials or special raw materials having a limited demand. Labor rate changes, fortunately, are less frequent and can be followed more easily.

Adjustments to expense costs will have to be made because of changes in both material costs and wage and salary rates. Experienced variations from standards will be shown in the cost control reports and actual volume in comparison with expense absorption volume will be disclosed by the production reports. All of these data should be subjected to continuing study, reflected in total unit costs when changes occur, and submitted to management regularly. Only with this information available can management do an intelligent, objective tactical job of planning sales prices and profits.

What Are You Going to Do to Meet Demand?

On a part with the problem of pricing in a period of violent cost changes, is the problem of how to service all customers, civilian and government, with a minimum of cost. This brings three basic questions into consideration:

(1) Should facilities be operated seven days per week and twenty-four hours per day, or should some orders be refused?
(2) Should changes be made to existing equipment to increase capacity?
(3) Should new facilities be added?

To answer the first question, management needs a comparison of profits at the several possible levels of activity. Here again, total costs are needed, for changes in volume have an effect on unit distribution and administrative costs just as they do on total factory costs.

The first step is to develop total cost at existing market prices and labor and wage rates at the maximum volume which can be achieved by working five days per week with no shift longer than the established length beyond which overtime premium is paid. Usually, this would also be the maximum production which could be achieved without adding to the fixed costs used in the factory expense standards. If this is the case, the adjusted cost figures, as developed for pricing, as shown in the illustrations, can be used as the base cost for volume planning. If this is not true, new expense costs must be developed for the maximum non-premium production.

The second step is to determine the added costs which will be incurred to produce the estimated volume. These costs will be made up of the overtime premium, added supervision, added clerical effort, higher maintenance, additional personnel in the sales service functions, etc. The third step immediately results. It is to compare the income from the added volume with the cost of producing it. With this comparison, management has the information needed for an informed decision as to the level at which to operate. Of course, even if the added income does not justify the added cost, the decision may still be to produce at capacity as a matter of customer service policy.

The cost comparisons needed to answer the second and third questions relating to the customer service problem, follow the same pattern as the first, i.e., the comparison of added cost with added income. As a final step, comparisons may be made of costs of the three alternatives of increasing production, paying overtime premium, changing existing facilities, and adding new facilities.

The Complicated Matter of Product Line Revisions

Emergency conditions may also necessitate the temporary revision of product lines, both through shortening some lines and through dropping others. Here, too, the effect of these changes on total costs and on profits must be considered. Answers must be provided to such questions as:

1. What cost reduction can be achieved through fewer set-ups and less down time if the line is shortened?
2. Can the present distribution channels handle and absorb a larger volume in a shorter line?
3. What costs now assigned to a product line will continue if the line is dropped?
4. How can the loss of income from dropping the line be offset, either by expanding the sale of existing products or adding new ones?

Space does not permit a discussion of the approach to the development of costs which will indicate the answers to these questions. Much of the work would follow closely the techniques already discussed. The important fact is for the cost accountant to recognize the need for special costs and then use

his ingenuity in developing them. This recognition of need should be anticipatory so that the answers will be ready when the questions arise.

Partial Costs in Tactical Planning: Alternate Materials

While the management tactics of pricing, setting operating levels, and planning product lines require the development of total costs by product lines, there are many areas in which partial costs will suffice or are preferable. In each of these, the cost data must also be up-to-the-minute and much of the information provided in the course of the development of the total costs is adaptable to the partial cost studies and should be used for them. This is most desirable, for it makes possible the presentation of a correlated cost picture with each segment meshing into the other. Two cases will be adequate to illustrate the costing problems in these areas.

First, let us consider the problem of the use of alternate materials. The rubber tile costs used in Exhibit 1 were based on the use of natural rubber. Let us assume that there are several types of synthetic rubber which could also be used to make this product. Each has a different market price, requires a different formulation, has different mixing and vulcanizing speeds, and has a different scrap loss. However, the finished rubber tile is of equally high quality, regardless of which of these types of natural or synthetic rubber is used. Management, then, asks the question as to the point at which the relative prices of natural rubber and of each type of synthetic make it desirable to change the formulation so as to secure the lowest unit cost of the finished product.

To answer this, up-to-the-minute costs must be developed for rubber tile made from each type of raw material. Not only must the material cost be calculated for each formula but also new unit labor standards and, possibly, new expense rates. The last named must be included if the different characteristics of the material make mixing appreciably more or less difficult, affecting the maintenance costs of the mixing equipment or if changes in the density of the batch alter power demand per machine hour, etc. Thus, in most instances, factory costs would be developed for all components of cost up to the assignment of general factory expenses. The decision as to when to use each raw material would be based on these relative specific costs. However, it may be that the changes in the kind of raw material used and the effect of these on other costs would result in increased or decreased demand for general plant services to the product, e.g., engineering, laboratory, materials handling, etc. If this were the case, then a reassignment of these general costs should be made and should be included in the cost comparisons.

Partial Costs in Tactical Planning: Demand for By-Product

Another example of the use of partial costs for tactical planning would be the establishment of a basis for decision to use new material for meeting peak demands for an end-product which normally is made from by-product material. To elaborate, a company has developed a product to utilize the by-product from another process. In normal times, there is an excess of the by-product and, therefore, it is costed into the consuming product at the labor and expense cost of handling. However, because of unusual demand for the consuming product, all of the by-product is now being used and customer requirements cannot be met.

Profit and Loss by Product Lines
Month of November, 1950

	Butter		Cheese	
	Actual	Forecast	Actual	Forecast
Units Sold	210,000	200,000	480,000	500,000
Average Price	85¢	90¢	42¢	40¢
Gross Sales	$178,500	$180,000	$201,600	$200,000
Net Sales	$176,000	$177,300	$198,000	$195,000
Std. Cost of Sales	140,800	157,000	168,300	177,220
Mfg. Variances: Efficiency	(14,380)	(7,250)	(4,120)	(4,380)
Price	1,900	8,000	5,100	16,300
Volume	(1,600)	-	1,000	-
Adjusted Cost of Sales	154,880	156,250	166,320	165,300
Gross Margin	21,120	21,050	31,680	29,700
Distribution Expense	8,800	9,000	13,860	13,700
Administrative Expense	5,280	5,300	5,940	6,000
Net Profit (Loss)	$ 7,040	$ 6,750	$11,880	$10,000
Capital Employed	$540,000	$540,000	$1,200,000	$1,200,000
Yield on Capital	15.6%	15%	11.9%	10%
Units Produced	180,000	200,000	510,000	500,000

EXHIBIT 4

The laboratory has found a material which can be used instead of the by-product but it is much more costly. All other production costs are unchanged by its use. In this instance, since the expense absorption volume of the consuming product has already been achieved with the supply of by-product available, all income from the above-normal sales of the product made with the alternate material can be applied against the total variable cost of producing the extra quantity. Thus, if sales income per unit were higher than the unit variable

cost of the product made with new material, the extra volume would add to total profits.

This problem also suggests the desirability of reconsidering the sales price of the commodity utilizing the by-product. If this price was based on a cost to make which gave no value to the by-product, it may be too low. The fact that demand now exceeds the quantity which can be produced from the by-product may indicate that the consuming product has found customer acceptance and should be considered as one which can pay its own way and not be subsidized by a "no charge" raw material. Here up-to-the-minute costs would be most helpful to management in planning a price structure which would be sound under all conditions of raw material supply and which may provide a reduction in the cost of the commodity producing the by-product and thus improve its competitive position.

Monthly Product Line Reports to Test Up-to-the Minute Costs

All of these up-to-the-minute costs used by management for tactical planning should be supplemented by monthly reports showing the actual profit or loss by product lines. Such a report keeps management informed of the effect of decisions on profit problems and brings into focus the areas of the business which require corrective action. Exhibit 4 shows one form which may be used for this report. In it achievement is measured against plans in each area of management. This is accomplished by showing the actual figures for the month in comparison with the forecast. This forecast may be that developed as a part of the annual budget, a semiannual or quarterly budget, or even an estimate prepared for management toward the close of the preceding month. The closer up the forecast, the better the guidance furnished management for short-term planning.

If representative up-to-the-minute costs are developed for pricing, they can well provide the base for planning profit for the coming month. This is particularly important in times such as the present when it is impossible to set standard costs which can be expected to be achieved over any extended period of time.

The form of commodity profit and loss report illustrated shows profit of the product groups after all costs except taxes on income. It requires the assignment of all costs to product lines and the summarization of income by product lines. However, all of these data should be determined in subsidiary records and work papers and should not be carried through the accounts.

There are many modifications in form which could be made to meet different

requirements of management. For example, a line could be added showing overtime premium costs. These could then be compared with the gains resulting from overabsorption of expense so as to measure roughly the net contribution of high volume to profit. Greater detail could be shown for distribution and administrative expense by separating advertising costs, research and engineering development costs, etc. Or the effect of volume on the absorption of distribution and administrative cost may be indicated by showing a standard figure and a volume variance for these. In short, conditions peculiar to each company, as well as unusual economic or operating factors which should be disclosed, will determine the amount of detail to be shown in the report.

"General Staff" Must Integrate Strategy and Tactics

No mention has been made in this paper of up-to-the-minute costs for cost control because their importance for this purpose has long been recognized and techniques have been much discussed in N. A. C. A. publications. In these, it has been emphasized that the men in the firing line cannot operate effectively without live control data. It is of equal importance that the general staff has up-to-the-minute information. Our discussion has centered on this area, for here there is room for even greater improvement in the character and content of our reports and in our costing techniques than there is in the factory and sales office.

The procedure followed will vary somewhat in each company, but the purpose will be the same—development of up-to-the-minute costs. The uses of the information will also vary as internal and external conditions change. Today, frequent and rapid adjustment of sales price and production volume plans is of prime importance. Tomorrow, it may be the revision of product lines or the substitution of materials or some other problem. The cost accountant must follow the constant changes on the business front, evaluate them, and report and interpret them to the company's general staff.

The tactics of business management will be successful in achieving the strategy of meeting all requirements of the economy, civilian and defense, only if its decisions are made on the basis of facts and not on hunches. These facts must be made available concurrently with any changes in costs or methods, not some time after the changes have taken place. The more intense a conflict, the greater the need for communications. In the fight to curb inflation, control costs, achieve maximum production, and earn a satisfactory profit under current conditions, the cost accountant dare not fail to provide up-to-the-minute costs for management planning if the battle is to be won.

Functioning of Standards In Cost Control

by PAUL C. TAYLOR

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The broad advances made in the area of cost control through the story told by the figures has often been impeded in small and medium sized companies by cumbersome or delayed applications and the approach is sometimes, even today, rejected by operating personnel in favor of control through observation. The author of the present article clearly portrays the prompt and penetrating variety of control which may be exercised on the basis of properly shaped standard cost information.

IN SPITE OF WIDE ADOPTION of standard costs in industry, there is still a very large number of companies which are not making use of them. In fact, there are still too many concerns which know little or nothing about their costs and are oblivious to all types of cost systems available. It is to the managements, including accounting managements in embryo, which have little cost information, that this article is primarily addressed.

There is much by way of error and half truth in circulation about costs. When the subject is brought up with managers of business, the comments made show varying degrees of comprehension. Light comes often as if through clouds. For example, I heard a salesman say in a prepared address "Without knowing its costs, a business is sunk. Your cost man can make or break you." He then proceeded to explain that about two years before, the management of his company had selected a number of salesmen and had turned them loose with instructions to get business at whatever prices they could. The company's product is a widely consumed and highly competitive one, distributed through retailers. The business came in but it was not profitable, since the salesmen had closed many deals at prices below cost. Here was one company which learned the hard way about the potency of good, reliable cost information.

The comments made by this salesman concerning costs are, of course, of the variety which we like to hear, even if they reflect belated awareness. On the other hand, mention of the possibilities of operating on a standard cost basis sometimes brings rejoinders like the following:

1. "I know very little about standard costs and from what little I have heard, they seem quite complicated and difficult."
2. "I am not interested in nor do I need costs worked out to the fineness of a gnat's whisker."
3. "I couldn't afford a setup like that. I have a small business and what we need is more income not more expense. It looks to me as if you are asking me to maintain a dual set of records."
4. "My business is different. There is nothing in it which lends itself to standardization."

Most of these statements are based on misunderstanding. This is apparent from the not unusual management complaints that the cost information it does want is not available within a reasonable time. Standard costs can help materially in this precise situation, for the simple reason that they are based on predetermination of cost and are operated to disclose exceptions or deviations from the desired or expected. Through comparisons of actual costs with predetermined standards, more bits of control information about a business are readily obtainable than is possible where the cost work is done on a purely historical basis. Furthermore, much of this data may be made available for use daily or even hourly, so that supervision may move quickly to matters needing control.

A Rubber Grommet, Standards, and Cost Control

The difficulty of imparting conviction on these points, where the logic of the matter seems clear sailing, suggests the need of case illustrations, the simpler the better. Our first one in this article involves the quarter horsepower motor used on the ordinary washing machine. On the motors is a cord which often has to pass through the sheet steel base of the machine. Some protection had to be furnished for this cord where it passes through the steel base to keep it from becoming frayed from use and eventually creating a short in the current. Ordinarily a small round rubber grommet is slipped over the cord and compressed into the hole in the base to avoid this possible difficulty.

One company was purchasing this rubber grommet from an outside supplier. A standard purchase price of 32 cents per hundred had been established for it at a time when the company had just started to use a standard cost system. On the very first invoice received for the part, it was noted when the standard price was entered on the invoice and extended by the quantity for later accounting purposes, that the billing price had jumped to 49 cents per hundred.

Here is where control begins. It was determined that the immediate difference was caused by the fact that purchase orders had been placed for a quarter's supply of the part at a volume large enough to obtain the best price, but faulty shipping instructions had caused deliveries in small quantities at the higher billing price. Since little was involved in storing this part and since it involved relatively little money, it was possible to discontinue the policy of numerous releases against the purchase orders.

This incident lead to an investigation of the ordering of other small parts such as screws, nails, taper pins, rivets, cotter keys, etc., and oddly enough, it was found that often purchase orders for these highly standardized parts were

being placed as frequently as twice a week. This, of course, resulted in a back-breaking load of duplicate motions and clerical effort to follow up, inspect, receive, store and record.

Then a look was taken also at some of the larger, more costly parts of the product. The washing machine tub was one such item. Seemingly acres of space in the plant were occupied by this part, plus outside storage on which a high rental was being paid, not to mention the extra cost of materials handling involved. The investigation came at a time when the company's management had about convinced its board of directors that $250,000 should be invested in a new warehouse for storing materials and finished product.

An almost complete reversal in procedure resulted in this case. All those small parts with little money cost in them were ordered on a half year and sometimes a yearly basis. They were brought into the plant and stored. In some instances, where more frequent releases were desirable, a good job was done of convincing suppliers that, since they were assured of orders for six months or a year, they could take advantage of volume runs, store in their plant, and ship as released by the customer. On the large parts with more money in them, suppliers were persuaded to feed the plant on a hand-to-mouth basis. Hence, when the quantity of these larger parts had been worked down to about a three days' supply the company, finding that it had more space than was needed, eliminated the outside storage. In addition, the new warehouse was forgotten and more and less costly production was obtained.

All of this happened because somebody had curiosity enough to start asking questions about the difference between the standard and the actual price of one shipment of a rubber grommet. In view of the casual and inaccurate operating viewpoints cited earlier, one is moved to ask, "What is so difficult to understand about standards and their control uses in cases of this kind? What is there complicated about such uses? Are they not, rather, simpler and more direct and, at the same time, more informative than other approaches to control?

The Search for the Fractional Tub Cover

The foregoing example related to the observation of material price variance where standard costs are in use. The same company provides an instance related to material quantity variance. The common sense simplicity of the material standard called for one cover for each washing machine made. Yet comparisons of actual consumption with standard showed one and three quarters tub covers going into each of the products. Again the company has

found itself at the point of control by the most direct route possible. The variance has been reported and the rest is up to supervision and management.

The tub cover is followed through the plant to see what happens to it. Here is a punch press into which an operator feeds sheets of steel out of which round blanks are cut by the die in the press to begin the process of making a tub cover. Soon it is noticed that each of these sheets is too short by about three inches to obtain the fourth blank—and the standard cost is based on obtaining four blanks. However, the operator and his helper are not aware of what is involved. They go right on blanking out that fourth blank and reporting it as good production. Among the wastes are scrap, power and wear on (and honing of) the die.

A checkback to purchase orders shows that this has been going on for nearly two years. The foreman explains that he had been told not to interfere in the business of the purchasing department. It was to buy the material and he was to use it. The operator's helper explains that he thought that extra piece of steel was there for his convenience to help him pull the sheet through the press.

The search for the cause of the three quarters of a tub cover variance does not stop here. It next focuses on the final assembly line where there is an inspector who, in addition to other duties, picks up a tub cover, looks it over and either sets it on the machine going down the line or throws it into a tote box set up to receive scrap. By this time the cover has grown to a subassembly. It has been formed into a terraced shape or Chinese hat shape or some other shape. It has been painted a pretty color in baked enamel on the top side and with expensive rust resistant aluminum paint on the under side. It has acquired a fairly costly rubber ring all around its outside diameter and it sports a fancy bakelite knob in the middle, by which it may be handled.

By watching the inspector operate for a little while, it is found that about one out of every seven or eight of these assemblies is assigned to the scrap box. On questioning, the inspector's explanation is that they are oversize and out of round. How did they get that way? Neither the inspector nor his foreman know and they have not considered it their business to find out. However, back in a corner of a storeroom, a stack of covers finished through the final forming operation, is found. There are 1,800 of them resting on a skid and reaching almost to a sixteen-foot ceiling. Surely some squashing must be going on at the bottom of the stack, since each cover weighs about three pounds.

After eliminating the waste of the short blank and the squashed covers, a comparison of actual costs with standards shows that 1.001 tub covers are going into each finished machine instead of the former one and three quarters

covers. Although it is readily granted that good supervision could avoid many wastes of this type without relying on standard costs to show them up, the best of operating conditions are such that only adequate and timely cost information provides accurate check on practices resulting in excessive costs.

Labor Cost Control the Next Morning

With respect to labor, too, prompt control is a natural result of appropriate use of standard costs. The example to be given here concerns watchfulness over labor performance, i.e. efficiency variance. The company considered used a tabulating card for a time ticket. At the end of each day these cards were collected and punched at an expense of about two hours of overtime for two key punch operators. The following morning a simple report showing operation number, and standard and actual time in man hours, was run and placed in the hands of each foreman by ten o'clock. It was a simple matter for a foreman to start controlling by picking out the operations he knew he was responsible for, noting those out of line with the standard and (if he did not already know the reason) getting out on the operating floor to discover what was going wrong and to try to correct it.

One morning these reports were prepared and held in the office in an attempt to find out whether or not they were used. In less than thirty minutes every foreman in the plant had come to complain that he could not get his job done without his copy. On another occasion, the president of the company happened to see the report and asked for an explanation of its preparation and use. He had come up through the marketing field and had shown little interest in cost matters. He took a copy, together with its supporting details, to his office and several days later it came back to the cost office with a memo attached, signed and stating "Thar's gold in them thar cards."

Again the quickness with which this kind of cost information points to matters needing control is perhaps the major advantage. It is a much better application of standards for control than an analysis of variance accounts which may not be complete for days and perhaps weeks after the end of the month. Such analyses do have their value but in a rather vague and overall way. The best time and place to begin control of costs is as close as possible to their inception.

Controllable Expenses Spotlighted

The compass of this article makes it necessary to omit examples of the operation of the efficiency, budget, and capacity variances with respect to the

expense side of the cost picture. However, the control services of standard costs are equally apparent here. How often it is said, "When volume or plant activity drops off, just watch costs go up!" Well, in a sense they always will but the statement generally leads me to feel I am talking with a manager who does not understand the interplay of cost and volume. He probably has a cost accountant who does not understand it either and consequently is issuing cost information which is almost useless for operating control purposes. For example, a foreman can do little about controlling items like fixed expenses which keep right on being incurred whether the plant operates at full capacity or not.

Standard costs recognize the difference between controllable and non-controllable items and segregate them in the records and accounts. Further, when a company is operating on a standard cost basis, recognition is given to the fact that certain outlays in a plant are losses rather than costs of production. They are treated accordingly to bring out the costs which really point to needed operating control. Most industrial accountants will recognize this general description as reflecting the theory of normal burden and the use of flexible expense budgets. However, these are text book terms and one hesitates to use them for fear that they will be taken as difficult, although their meanings are not.

More—and More Useful—Variances

One defect commonly found in standard cost systems is the use of too few variance accounts, or so it seems to me. The more usual ones are known to be material price and the material quantity variances, labor price and labor efficiency variances, and expense efficiency, expense budget, and expense volume variances. The additional ones which might be used grow out of analyses of these primary ones.

Each business is an individual case and each will have to decide for itself what specific variance accounts it may want to set up. Price variances could be extended to an account separately for each of several kinds of materials and labor and the several kinds of expense, such as advertising, supplies, sales effort, services and many other items for which a monetary price is paid.

A useful variance not often developed might be called a "length of run" variance or "set-up," "preparation" or "make-ready" variance. This one is particularly useful in plants producing the annual model type of product. In these plants it is not uncommon to go into production before all the "bugs" in design and elsewhere, have been eliminated. Often a multiplicity of troubles arise and for a considerable time production lags, profits disappear, and

management does not learn the particulars soon enough. The "length of run" variance is a valuable tool in bringing these excessive costs to attention quickly.

Still another claimant for consideration is the calendar variance, not to be confused with the volume variance. For every business it is true that at least some of the operations are not the same on all days of the year or at all seasons. For instance, fuel cost may run heavy for six months. Often it is of considerable value to segregate this sort of variance from the regular operating variances. It may not be desirable to try to book them but they should be separated for purposes of reporting to management.

What might be called a ratio or mix variance is often of value in plants producing by- or co-products. The use of wood in paper mills or chemicals in manufacturing lead to this type of variance. Where more than one product is made from the same material and the material, itself, is in different sizes, careful pre-planning must be done as to the amount of product to be obtained from the material. Operations may be performed efficiently in the plant and still variances will result from the ratio or mix of production.

What detail variance accounts are used will depend largely on the size of the variances out of which they are to be developed and the impact on the profit position. The cost of splitting off additional variances and the extent to which management will understand and use multi-factored variances, are also influences.

Standard Costs Yield Dividends in Control

To sum up, standard costs do not need to be complicated and difficult to understand for either the large or small business. In fact they should not be. So far as expense goes, the installation will not be made without cost, but the operating cost of a standard cost system is often lower than that of any other method of producing cost information. Were it higher, full justification is found in the greater amount of information provided to assist in operation of the business and the timeliness of this information in pointing to matters needing control.

"Thirty Days Hath September"

by LAWRENCE P. JENNINGS

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Where account must be taken of differences—often larger in significance than the absolute amount would imply—the intrusion of extraneous or random causes of variation is a real vexation. Such has been the accountant's quarrel with the months of the conventional calendar. Here proposed is a new device to overcome the difficulty, after a review of existing solutions.

SO FAR AS I KNOW, Ugo Buoncompagni was neither an accountant nor a businessman yet, as Pope Gregory XIII, he created one of the most obstinate problems faced by members of the accounting profession, through the establishment of the Gregorian calendar. This version of the twelve-month calendar, under which we still record the passage of the year's time, contains many obvious defects from the standpoint of going-concern accounting. Adjustments must be made if operating reports prepared for top management are to contain information immediately usable for comparison and control purposes.

Probably the most outstanding defect is the variation in the number of days in each month. A thirty-one day January followed by a twenty-eight day February can be particularly vexing to the accountant who must prepare comparative production reports, sales reports or controllable cost reports. Not only must some adjustment be made for the difference between the total number of days in each month, but further adjustment must be made for the difference in the number of working days in each month. Other defects which might be noted include the fact that quarterly reports require similar adjustments and special problems exist in the handling of legal holidays, which may or may not require adjustments.

Two Ways of Applying the Thirteen-Period Year

Fortunately, the calendar problem is not insoluble. Probably the most widely applied solution to the problems imposed by the Gregorian calendar is the thirteen-period accounting year which has been used for many years by some of the larger business concerns throughout the country. Its international counterpart is the proposed world calendar and this will also be discussed. Under the thirteen-period plan, the calendar year is divided into thirteen periods of four weeks each, with each period having tweny-eight days. With the exception

of periods containing legal holidays which fall on work days, all periods are the same length and are, therefore, comparable without adjustment. As a result, the cause of variations, as reflected by comparative reports from month to month, can be traced to operating causes without the prior necessity of determining to what extent they are attributable to calendar irregularities.

However, the Gregorian calendar cannot be disposed of without making some allowance for the fact that the thirteen-period calendar accounts for only 364 days of the year, leaving one day left over in ordinary years and two days in leap-years. These extra days may be taken care of in one of two ways. The method used by the majority of business concerns which have adopted the thirteen-period calendar, is to let the extra days accumulate until they amount to a week and then to insert a week every five or six years in one of the thirteen periods. The choice of years for this purpose is dictated by the number of leap-years that may intervene. Of course, when the extra week is inserted, the period affected is no longer comparable with the other periods in the year in question and allowance must be made for this in comparative statements. The other method of taking care of the extra day or days is to include it (or them) in the thirteenth period. As in the case of the first method, this will result in a period not directly comparable with the other periods of the year and for which allowances must be made.

The popularity of the first method may possibly be attributed to the fact that under it every period always begins and ends on the same day of the week. Such an arrangement not only provides an opportunity for more efficient scheduling of the accounting department work load, but may be further rendered convenient by providing accounting periods which coincide with payroll periods, thus eliminating accruals with their attendant additional bookkeeping entries. These possibilities are lacking in the second method under which, as under the Gregorian calendar, every year begins on January 1 and on different days of the week in successive years.

Characteristics of Proposed World Calendar

The world calendar—which has been proposed for international adoption and which even now is on the agenda of the United Nations—might well be considered at this point since it combines the best features of the two methods just described. The world calendar consists of thirteen months of twenty-eight days each and very neatly disposes of the extra day or days (depending upon whether the year is "ordinary" or a leap year) by classifying them as legal holidays not connected with any particular month. Each month within a year would start and

end on the same day of the week and, because all business concerns would be operating upon the same calendar basis, it would become the normal and practical thing for accounting to be done on the thirteen-period basis.

Admittedly the world calendar if universally adopted would solve all of the problems encountered in connection with the Gregorian calendar except that of the irregular incidence of legal holidays within months. However, as if this exception were not enough, the campaign for such a calendar is now in its twenty-sixth year and the chances for success in the foreseeable future appear to be extremely remote.

Disadvantages of Thirteen-Period Calendars

Thus far in our review of methods of applying the thirteen-period calendar, we have considered primarily the advantages which might be realized by its adoption. At this point, let us consider a few of the disadvantages. One disadvantage which is of particular importance to the industrial accountant, is the fact that, while the thirteen-period year levels off the Gregorian calendar into twenty-eight day units, it does not go all the way to correct the variation in the number of work-days in each month. At the present time, most industrial concerns observe six legal holidays per year, each of which falls in a different month of the year. When these holidays fall within the normal work-week the result, insofar as the thirteen-period calendar is concerned, is that six periods have nineteen working days and seven periods contain twenty working days. If the industry is one which observes plant-wide vacation periods, the situation is further aggravated by a period containing only ten working days. Under circumstances such as these, the adoption of the thirteen-period calendar would be of no avail in solving the basic problem, the variation in the number of days in each accounting period.

Another disadvantage, and one which varies directly with the size of the accounting operation, is the fact that thirteen periods mean an additional closing and the preparation of an additional group of all operating reports. While some applications of the thirteen-period plan may result in clerical savings which more than compensate for the cost of the additional closing and related reports, there will be applications, particularly among the larger companies, in which such additional costs will present serious problems.

A third disadvantage in the thirteen-period plan is the problem encountered in the handling of fixed charges, such as rentals, salaries, and contract services. While salaries may possibly be handled so that payment is made on the basis of thirteen pay periods, expenses involving other companies and outside agen-

cies will continue to become due on fixed days of the month without regard to the accounting periods established.

Finally there is a further disadvantage, which is usually pointed out by proponents of the thirteen-period plan, themselves, in recommending that it be adopted for internal accounting records only. Where monthly financial statements must be prepared for stockholders—or for the ever-increasing number of governmental agencies—adjustments must be made so that the financial statements conform to the Gregorian calendar.

The Twenty-One Work Day Accounting Month

In view of these disadvantages, it appears that the thirteen-period calendar is not the solution for which we are seeking. What, then, is the solution? A few years ago the accounting department of Caterpillar Tractor Co. reached the point in its development at which the rapid expansion of the company dictated the need for some solution to the calendar problem. Because Caterpillar conducts the type of operation which would be most adversely affected by the disadvantages of the thirteen-period calendar in that it observes six legal holidays a year and effects a plant-wide vacation shutdown of two weeks, it was immediately evident that some other solution must be evolved. That solution was the twenty-one work-day accounting month.

The twenty-one work-day accounting month, based on a five-day week Mondays through Fridays, is both simple in operation and sound in approach. The theory behind it is a combination of simple mathematics and common sense. In any ordinary year, after allowances are made for Saturdays, Sundays, and six legal holidays, there are 255 working days which must be allocated over twelve working months. The application of simple mathematics discloses that there are 21.25 working days in each working month. The application of common sense indicates that the twenty-one days will constitute an average work month provided that the extra one-fourth of a day is included in the vacation month. This will be distorted in any event because of the plant-wide shutdown.

From that beginning, the establishment of the twenty-one work-day accounting month proved to be a simple and effective measure. A glance at a calendar for the year 1951 and the application of the following instructions will demonstrate the foregoing statement.

1. Starting with January 2 (remembering that Saturdays, Sundays, and six holidays do not constitute work-days) count off twenty-one working days and draw a circle around the twenty-first day.

2. Repeat this procedure until the last complete tweny-one work-day period immediately prior to the vacation month of August is reached.
3. Count backward from the last working day in December, continuing to count off periods of twenty-one working days, until the first complete twenty-one work-day period immediately following the vacation month of August, is reached.
4. The period between the last dates noted in 2 and 3 above constitutes the accounting month of August.

If these instructions have been followed, accounting cut-off dates for every month in 1951 will have been established as follows:

MONTH	CUT-OFF DATE	NUMBER OF WORKING DAYS
January	January 30	21
February	February 28	21
March	March 29	21
April	April 27	21
May	May 28	21
June	June 27	21
July	July 27	21
August	August 30	14 (Vacation)
September	October 1	21
October	October 30	21
November	November 29	21
December	December 31	21
		245

The accounting department at Caterpillar Tractor Co. establishes accounting cut-off dates in this manner every year and such dates are used throughout the entire organization in the accumulation of all the facts and figures which must be compiled by the accounting department in discharging its many obligations to operating management. In reviewing this schedule of dates, certain facts become immediately apparent. Like the thirteen-period plan, our system is faulty in that we always have one period during the year which is not directly comparable with any other period. On the other hand, our system provides eleven periods which are identical.

Because accounting months coincide with calendar months to a great degree, no adjustments are required to work accounts payable and accounts receivable into the system. As a result, the twenty-one work-day accounting month can be and is used for all accounting records, including financial statements prepared for outside agencies. Because the twenty-one work-day accounting month results in the conventional number of twelve months a year, the costs of additional closings and additional reports inherent in the thirteen-period accounting

year are avoided nor need fixed charges be reallocated from their monthly incidence, since they will fall naturally into the accounting month.

Based upon the experience of the past few years, the twenty-one work-day accounting month offers tremendous possibilities to the accounting department of going concerns. The standardization of all compilations of facts and figures results in operating reports which may be compared to prior month's reports without adjustment and also compared to each other in every instance where the factors of production and merchandising may be related.

Except (Only) August

The Gregorian calendar presents a real problem to the going-concern accountant. Charged with the responsibility of keeping his finger on the business pulse, he must constantly adjust for the variations in time periods if he is to interpret that pulse accurately. Although certain benefits may accrue through substitution of the thirteen-period accounting year, this remedy is not completely adequate because:

1. It does not level off the calendar month into work-day units which are comparable, at least not more than fifty per cent of the time.
2. It involves extra labor caused by additional closings and reports.
3. It is limited in scope to internal accounting.
4. It presents additional problems in the allocation of fixed charges.

The twenty-one work-day accounting month—although only eleven-twelfths perfect—*is* the business pulse because it is related to that unit which is being measured and reported upon, the work-day, and contains none of the disadvantages inherent in the thirteen-period plan.

POINTS

PEOPLE LIKE TO KNOW

DURING THE POSTWAR YEARS, our thinking and discussion has centered on the mechanics and aims of accounting. The personalities, that is, the people who perform these mechanics and accomplish these aims have been relegated to a place of obscurity in our thinking and discussion. Perhaps if another acute personnel shortage occurs as a result of military operations, the human factor will again regain the considerations it should have had at all times. For example, how often an accounting clerk is placed in a job and goes through the mechanics of accounting for thousands of dollars of company transactions, knowing only the mechanics of the job.

Many supervisors contend that it does not pay to spend the time necessary to alter this situation with respect to the average accounting clerk because "He (or, quite often, she) will leave in a year or so anyway." I cannot subscribe to that viewpoint and counter with the thought that well-trained clerks feel that they are an integral part of the organizations and are not, therefore, as apt to change jobs as when they merely know the mechanics of a job. Adequate training of clerical personnel will pay dividends.

N. F. KRUSE, *Muskegon*

FIXED—IF YOU THINK SO

IT SEEMS TO ME that industrial accountants who are close to or form a part of top management today are in a position to go beyond the scope of their present known service to industrial management and break down the resistance which seems to exist in connection with control over so-called fixed expenses fixed costs. It no doubt is true that there is no such thing as fixed costs and that all costs can be controlled and thereby reduced to a form of variable costs. Possibly the terminology, "fixed costs," which has been given to certain expenses incurred for the production of goods, has led management to believe that these costs cannot be reduced or controlled. It may be that industrial accountants have been negligent and have failed to think far enough ahead or to work closely enough with other members of top management to bring about a real control of these so-called fixed costs.

For example, do industrial accountants plan far enough ahead to determine whether or not a reduction of charges for depreciation or obsolescence of machinery used in the operations in the various departments of the enterprise, may be effected by replacement of existing equipment with more efficient and therefore more economical and modern equipment on the market today? This determination can be made through effective study and analyses of the operation of the existing equipment in comparison with the service expected of the new equipment. It is a study which requires the services of both the accountant and the engineer to produce accurate results but it is a survey which, if not instigated by the engineering department, should certainly be suggested by the cost accountant.

JOHN A. BARD, *Washington*

DEFENDING DEFENSE DOLLARS

COST ACCOUNTANTS SHOULD BE MAKING a special effort now to impress upon their employers and upon government procurement officers the importance of cost control

OF VIEW

and cost reduction in connection with the production of war material. The expanded program now getting under way, will take an increasingly large precentage of our national income, even under the most favorable circumstances. If costs are disregarded as they were during the early period of World War II, the percentage of our income diverted to paying for the instruments of war will be even larger. Therefore, we should be advocating the universal adoption of a well-defined program of cost control and cost reduction in connection with the manufacture of all products to be used in our greatly expanded war production program.

In view of the fact that (as this is being written) the situation is not as critical as it was in the days immediately following Pearl Harbor, it would seem that manufacturing costs should not be disregarded to the extent that they were some ten years ago when the demand was for maximum production regardless of cost. While it is true that President Truman has recently declared a state of national emergency and has announced a greatly expanded defense program, nevertheless, the situation does not appear critical enough at the moment to warrant the to-be-feared almost total disregard of monetary cost, in order to obtain maximum production of war products. In fact, in view of the rather substantial increase in the price of critical raw materials since the first of this year, there is even more reason than there has been for all munitions manufacturers to make a special effort to control and reduce their costs.

PAUL CROSSMAN, *Omaha*

THE HANDWRITING ON THE CHECK

WE ARE A MEDIUM-SIZED INSURANCE COMPANY operating in Connecticut and issuing over eighty thousand checks each year. Of these only fifteen thousand, representing home office payroll checks, are handed to the payee in person. The remaining sixty-five thousand are mailed to their destinations by regular first class mail.

We have recently decided to abandon entirely the practice of checking endorsements on checks, including payroll and pension checks. We reached this decision after considering the following facts:

1. The average person is honest, as evidenced by the fact that a study of our experience for the past twenty years brought to light only two cases of forged endorsements, each on a check for less than ten dollars.
2. Fear of the penalty involved tends to make even the dishonest person hesitate to forge an endorsement.
3. The likelihood of one of our checks falling into the hands of a potential forger is very slight in proportion to the volume of checks issued.
4. The clerical expense of checking eighty thousand endorsements per year is too high in comparison to the possible benefits to be derived.
5. Over the period during which we did attempt to check endorsements, we found that the handwriting of the same person would vary greatly over a period of a few years. Furthermore, we did not feel that our staff could practicably be trained to detect an expert forgery.
6. When the payee fails to receive his check on time, he will almost invariably notify us. We can then place a stop-payment order at our bank.
7. The great majority of checks are cashed directly at banks and the banks require the payee to identify himself, especially so when the amount of check is large.
8. Finally, the bank which cashes a check is responsible if the endorsement of the payee is forged. In the two cases referred to under (1) in above, we were able to return the checks through banking channels and recover our money.

HUGH J. MACDONALD, *New Haven*

Using the Figures for Credit Appraisal

by ROBERT YOUNG

Assistant Treasurer, Bethlehem Steel Company, Bethlehem, Pa.

There is much interpretation for a credit man to do, the present author indicates, and this interpretation is in large part dependent on financial and cost statements which are not only reliable but handy as well. The credit man's preference for percentage expression of dollar amount relationships and his concern for the effect of price level changes on company position are brought out.

ONE OF THE FUNCTIONS of the industrial accountant is the preparation of a portion of the factual information needed for intelligent credit appraisal. It may be that the information is necessary to support the company's own line of credit obtained from commercial lenders or from venders. In addition, the training and experience of the accountant in analyzing financial cause and effect and his knowledge of all phases of business management gives him the basis upon which to be of material aid to his company's credit manager in the proper performance of the latter's duties with respect to the implications and adequacy of data presented by customers seeking credit or extension of amounts due.

First of all, what is the purpose of credit appraisals? Willingness on the part of a company to pay is reflected in past performances and in integrity of management. Ability to pay is not so easily appraised. Granting that a management has the willingness to pay its obligations, the two fundamental questions for which answer is sought relate to its ability to do so. The questions are: (1) will the company be financially able to observe promptly existing terms of payment and (2) if there is doubt as to ability to meet existing terms, will it ultimately be able to pay 100 cents on the dollar?

The ability of any management to perform its legal and contractual requirements in retiring the company's obligations is reflected in its balance sheet position. Although it is still as true as it has always been that the balance sheet is the principal source of information for short-term credit, the credit manager must also consider how that position may be altered as a result of changes reflected in operational profit and loss statements. However, the balance sheet position is the cross sectional picture of a business as of a particular date.

And Beyond the Balance Sheet

Unfortunately, in some instances, the balance sheet showing has not later been borne out by the facts and a need for a supplementary analysis of financial prog-

ress and trends of a company as reflected in the profit and loss statement has become evident. This need springs from item-by-item analysis of the balance sheet to similar analysis of the operating statement and opens the door to an analysis of general accounting and cost accounting procedures, cost methods and cost results in an attempt to assess the mangement's operational skill, its controls and checks on operations. In this it exposes to view the work and cardinal responsibility of the cost accountant of the credit applicant in producing interpretable costs and analyzing the current trend in the particular business with respect to production per man hour and the elimination of time and material waste. Hence, even the day-to-day functioning of the cost accountant has ultimate credit implications.

In giving management full details on operations so that management may know if it met or failed to meet its goals, the accountant is offering a still further service. Intelligent creditors are interested in such data in the appraisal of a company's long pull possibilities, in estimating the "going concern" value of the business and are also interested in knowing that the management is provided with such information. When it is apparent that management knows what it is doing and knows its hazards and is prepared to meet them, a certain intangible influence is shed on a company's credit position, measurably bettering it and instilling a factor of credit goodwill in the mind of a discerning credit executive.

Credit management is based almost completely on intelligent interpretation of adequate factual knowledge, for which interpretation there is no yardstick and no substitute for reflective experience and judgment. The assurance that a management is intelligently attentive to its own problems is one consideration in exercise of that judgment. This paper will have more to say about operating results later on.

The "Comment Type" Balance Sheet

Nevertheless, the truth of what has been said in the foregoing paragraphs does not belie the fact that a credit man's primary factual reliance is on a properly prepared balance sheet. It is one objective of this article to discuss the results of accounting as it is reflected in a credit appraisal of the balance sheet with special reference to a type of presentation which has proven handy for the purpose. The terminology of the balance sheet should reflect simplicity and should be accompanied with an adequate explanation of the background of each item. The comments should reflect the nature, valuation and (whether prepared and verified by internal or external personnel) the procedural steps

BLANK COMPANY, INC.
BALANCE SHEET
DECEMBER 31, 1948

ASSETS		COMMENTS
Current Assets:		
(1) Cash	$ 60,000.00	(1) The cash on hand was counted. The cash in banks was reconciled with confirmations received directly from the depositories.
(2) Marketable Securities (at cost)	50,000.00	(2) The marketable securities represented $50,000.00 - United States Treasury Bonds - 2½ - 1958-1960. These were examined. The market value at December 31, 1948 was $51,345.00.
(3) Accounts Receivable:		
Customers	$ 98,000.00	(3) The accounts receivable were in agreement with the trial balance of the detail records. Requests for confirmation were mailed to all accounts. The replies received represented $40,250.00 or 41.07% of the accounts
Other	2,000.00	
	100,000.00	

COMMENTS	LIABILITIES	
	Current Liabilities:	
(11) Notes payable - bank represent an unsecured 90 day note dated November 2, 1948 with the Security Bank and Trust Company. The interest rate is 3½ per annum. The amount of the note and the terms of the loan were confirmed by direct correspondence.	(11) Notes Payable - Bank	$ 50,000.00
	(12) Accounts Payable - Trade	75,000.00
(12) Accounts payable - trade were checked to the detail records and were found to be in agreement. Confirmations were mailed to a selected group of creditors. Confirmations received represented approximately 75% of the total amount and no exceptions were reported.	(13) Accounts Receivable - Credit Balances	1,000.00
	(14) Accrued Payroll	2,000.00
	(15) Accrued Interest on Mortgage Payable	200.00

EXHIBIT 1

taken to assure accuracy. This brings us to the "comment-type" balance sheet which has come to our attention and is presented here in Exhibit 1.

To the credit man, the advantages of this form are considerable:

1. **The balance sheet comments are presented in a clear and concise manner.**
2. **The comments appear on the same page as the item being commented upon and directly opposite it.**
3. **Explanatory letters which easily become involved and confusing, can be eliminated.**
4. **Comments are made on all important major items. A letter of comment may overlook some.**
5. **If it is desired to look at the balance sheet without the comments, this may readily be done by folding the latter back.**

Balance Sheet Analysis

A review of a balance sheet for credit purposes requires many somewhat routine checkups. Cash is ever a significant figure. Receivable items reflect price changes, collection percentages, and financial stringencies if they are pledged. Cost background is especially important with respect to inventories. The balance sheet should

reflect the cost method used in pricing inventories and should include an explanation as to why the method is used. The many existing methods include:

Locom	**—Lower of cost or market.**	**Hifo**	**—Highest in, first out. Keeps figures below market.**
Liap	**—Last in averaged price.**	**Fifo**	**—First in, first out, inventories (on rising market) generally above market.**
or Lipa	**—Last in price averaged, starting with beginning cost and averaged each month to last in price.**	**Knifo**	**—Keep no information for others.**
Lifo	**—Last in, first out, inventories (on rising market) below market.**		

From the point of view of credit appraisement, it is necessary to know how readily inventory can be converted into cash in the normal operation of the business and its cash convertibility in case of forced liquidation. Analysis of the costing method used is necessarily important in such determination. On the balance sheet, a breakdown as to finished, in process, and raw material inventories is called for in analyzing the liquidity of the inventory investment in relation to salability of raw materials and the finished product. Relating the breakdown to monthly or yearly billing, to the manufacturing period, and to the marketability of each product as determined by quality, design, or style will further expand its value.

In discussing valuation of inventory, the indulgent manner in which some companies treat profits which may have found their way into inventory should be mentioned, including failure to think of such profits as fictitious. For example, if a unit which cost $8 is sold for $10, the $2 apparent profit does not exist if replacement of the unit in inventory will require $10. The apparent profit is not true profit because there is no actual gain in cash nor is cash made available for expansion or dividends.

For another example, a soap producing company had an inventory composed largely of fats and oils, which was valued on a first in, first out basis at $57 million at the midpoint of 1946. The Bureau of Labor Statistics' index of fats and oils rose 178 per cent between that date and the end of the year. Assuming that the stated value of the inventory rose 100 per cent (because of higher cost of purchased material in the last six months) and that its physical size remained unchanged, it follows that in the six months period $57 million was added to income (by being allowed to rest in inventory) which did not represent usable profit as the cash had already been spent to pay for the increased inventory valuation, with no greater physical quantity on hand than previously.

The treatment of applying a dollar yardstick to all physical property at the beginning of the year and at the end and calling the difference profit or loss, fails to separate changes in physical property from price changes and may re-

flect profit when assets are actually declining and may reflect losses when assets may actually be increasing. The "lifo" principle of inventory valuation goes far to reduce the impact of these major fluctuations. It eases a deflationary trend if quantities do not become excessive or physical quality is not impaired, but puts greater importance on timing inventory replacements.

Fixed Assets and Fixed Capital

Further appraisal of the financial statements develops significant information from an analysis of the property account. Creditwise, fixed assets form the basis for appraising the ultimate (as distinguished from the current) payment characteristic of the company. Their analysis reflects in important ways the skill of the management and its avenues of financing.

Especially does analysis of the increases in the property account add further chapters in the revelation of the management's skill. One proper inquiry is: to what exent has production per man hour been increased or labor per unit of production lowered as a result of increases in plant facilities? Plant enlargement for increased production may turn into a liability problem with falling volume, whereas enlargement for lower costs aids the competitive position and expands profit margin if volume increases or is at least maintained.

Much has been said and written about the inadequacy of depreciation charges to allow for permanent increases in property costs. With depreciation charges set on original costs, other allowances must be made for the capital necessary to replace property. Recently some accountants have set up balance sheet reserves to compensate for changes in the purchasing power of the dollar.

Not far removed from questions related to plant are those related to sources of capital. Inability to raise equity capital because of high taxes and the preference of managements for debt rather than equity capital has created a significant group of potential credit risks composed of companies which have improved plant facilities at the expense of working capital and have replaced that working capital with creditor debt, usually in the form of bank loans. This process sometimes continues to the point of seeking relief in the form of extensions from merchandise creditors or the pledging of receivables and inventories. The balance sheet must be scrutinized to disclose such factors if they exist.

Operating Trends and Credit Analysis

Changes in a creditor's ability to pay are reflected in the profit and loss statement and a breakdown of the profit and loss statement puts the spotlight on costs, cost results, and cost methods. Incidentally, credit men like to see profit

and loss statements include individual item percentages and comparative yearly percentages. (This predilection for percentages applies also to the balance sheet and statement of surplus and distribution of net profits). Dollar value comparisons can be too cumbersome and often lack specific application. Important changes in percentage of direct and indirect costs in relation to total costs or cost of sales warrants exploring.

This article has already included general discussion of the effect on the balance sheet and profit and loss statement of choice of cost method for pricing inventory. With regard to the operating statement as a whole, first interest lies in the results, that is, in margin of gross profit. Direct and indirect costs and net operating profit next take attention. Statements should clearly show this operational result, which should not be combined with income derived from sale of assets, insurance benefits, etc. Is it not the task of the cost accountant, as someone has phrased it, to "See that the facts are revealed as they are and the truth as it is"?

I recall a case in which a substantial company profit was made but plant operations indicated no profit. The favorable results came from insurance benefits and sale of plant facilities. A true reflection of operations is of vital significance in measuring the management's operational skill. In the case referred to, the management contended it was no business of a creditor how profits were made, so long as they were made. Yet each such factor is of value in a credit appraisal.

Where company operations serve more than one geographical territory and involve more than one distributing center or manufacturing plant, it is important that accounting data show the percentage of sales and net profits that each unit of operations contributes to the total dollar value of sales and profits. Obviously, a large contribution to sales but a small contribution to profits calls for some internal analysis. Incidentally, the extent to which sales effort can be guided by such an analysis is surprising and gratifying.

Where is the Break-Even Point?

One of the most significant supplements to the profit and loss statement is an analysis of changes in break-even points, that point of capacity operation which covers all costs, variable and fixed. In recent years, with costs increasing, break-even points have been steadily mounting too. As someone has paraphrased it, "The economic ear is being deafened by the breaking of break-even points." More and more credit appraisals must take into account the "long pull" aspects of a risk. In the attempt to gauge a customer's preparedness for competition

and in measuring management's skill, analysis and application of tests of the break-even point are gaining in favor. Determination of this critical point reflects a fairly clear picture of internal and external influences upon a company's operations.

The day is not too far off when break-even charts will rank equally with profit and loss statements and accountants will show periodic profit and loss statements related to current break-even charts in their audits of management's performance. To render this entirely credible, it is necessary only to consider a few of the substantial number of uses to which break-even point analysis can be put:

1. Projecting results of changes in operating policies or reactions to varying economic conditions.
2. Disclosing profit outlooks for a given forecast of sales, affording a predictable relationship between sales and profits.
3. Gauging major cost changes and their effects on net profits.
4. Measuring extent of basic security in continually striving for lowering of constant expense.
5. Determining available latitudes for increasing or decreasing selling prices.
6. Gauging profit valued proposed major changes in plant facilities.

As credit appraisals are made, it is of vital importance to be able to assess the company's ability to maintain profits under conditions of declining volume and to estimate how close the company may be to a questionable credit risk. Re-emphasizing the credit man's interest in these factors will tend to keep management's attention focused on its break-even position and to increase its conscious desire to know its present and potential costs so that it may maintain a reasonably comfortable margin above its break-even point.

Those who extend credit are primarily interested in a company as a going concern and not as a subject for liquidation. Learning its weaknesses while it is in operation and assisting in effecting corrections is a constructive credit accomplishment and an aim of every constructive credit policy. Break-even analysis is extremely important in this endeavor.

Some Pertinent Questions

In other words, the credit analyst is concerned, as is the industrial accounting staff of any company which may come under consideration, with the soundness of its operation and its prospects. It may help to align the sights of both to repeat here a series of questions provided not long ago in an address by Keith Powlison, Vice President and Comptroller of Armstrong Cork Company, designed as warnings applicable of the many ways in which it is possible to

slip off the profit beam. In Mr. Powlison's words, the test questions, all of which are worth considering, follow:

"1. Is the growth record of the company more impressive than its earnings record?
2. Does the company have the reputation of being aggressive in adding new business rather than realistic about eliminating unsatisfactory old accounts?
3. Is it found easier, under the practical operation of the company's policies to obtain approval of an appropriation to improve slightly an operation which is in the red than it is to increase by a larger amount the profit on an operation already profitable?
4. Does the job evaluation plan of the company place major emphasis on size factors?
5. Is the reputation of the company for so-called modern, streamlined management better than its actual records as a money maker?
6. Is the company's organization growing faster than either volume or profits, particularly the latter?
7. Are profit incentives for management personnel recognized as more important than incentives for nonsupervisory workers?
8. Is the company a business hypochrondriac? Are business doctors called in to find the solution to the toughest problems?
9. Is the periodical review of operating statements a penetrating diagnostic procedure leading to the development and application of plans to strengthen the business?
10. Is a substantial part of today's profit coming from over-absorption of fixed expenses because of high volume, rather than from the difference between income and costs at normal volumes?"

Balanced Credit Policy

It may interest to comment in closing that a curious soul has figured that it takes 165 mental processes to arrive at an intelligent credit decision. Recently, a beginner's report on the credit department of our company properly suggested what greater experience confirms, i.e., credit policy must not be too severe, for sales volume will suffer, nor too liberal or sizeable losses will result. The pertinent comment was made that "the ideal situation is to get stuck with your eyes open."

Credit men should be keeping their eyes open at all times to every phase of the credit risk and should be continually watching the scoreboard of operations, consisting of the balance sheet, profit and loss statement and the supporting accounting detail which is so indispensable to intelligent credit appraisals. The assistance of the industrial accountant is needed in many ways.

Work of a Manuals and Procedures Section

by ROBERT W. GRIM

Supervisor, Manuals and Procedures Section, Owens-Illinois Glass Co., Toledo, Ohio

A means of effecting close control of the preparation, presentation and distribution of accounting and related procedures, wherever originated or used within the company, is offered in this article. The control described is achieved without minimizing the part which those who must administer procedures properly play in their origination and revision.

OUR COMPANY BELIEVES in procedure manuals for the simple reason that they work and have continued to work over a period of years. Our experience has shown that, wherever manuals are introduced, the results are savings in supervisory time, fewer errors, better understanding of procedures, the development of simpler and more consistent procedures, faster introduction and more complete acceptance of new procedures, greater flexibility in work assignment and better and faster training of new employees. These benefits are definite and immediately noticeable.

Nevertheless, we have learned that the benefits are permanent only so long as the manuals continue to retain the confidence of those who use them. However well a manuals program has been sold to management and to operating personnel, it must be actively and effectively maintained. Once begun, a manuals program has no end. It is a continuing thing, a planned and integral part of business operations, constantly adjusted to meet the needs of these operations. It must be handled as a major responsibility by adequately qualified personnel who recognize that manuals must be organized and written from the standpoint of their end use, with the material so presented that it can be read and understood by all individuals concerned, regardless of limitations of technical knowledge and experience.

Setup of the Section; How Manuals Originate

In our company a manuals and procedures section has been established in the comptroller's department as a part of his staff, to administer the manuals program for accounting and related activities. This section is a coordination point for organizing and shaping manual material which may be submitted from other parts of the company, originated by the section itself, or developed in collaboration with others. The section is responsible for making

sure that all manuals conform to authorized company policies and practice. Its personnel keep in close touch with both overall company developments and the specialized features of divisional operations and serve as a central information point for questions on procedures.

A fundamental principle of the section's operation is the maintenance of close contact and coordination with operating divisions. In many instances the basic details and even the scheme of presentation of procedures to be manualized, can best be developed by the individuals who are responsible for directing such procedures. From their close contact with the related operations, they are most familiar with the points that should be emphasized. Hence, a considerable portion of our manual material is originated by personnel in the operating divisions and is received in relatively well-organized form. This has the advantage of supplying a preliminary review of the procedure by qualified personnel, which often results in improvements which would not otherwise be incorporated when manualized. The work of operating staff in this connection serves the added purposes of providing sound and complete factual data with a minimum of research time on the part of the section's personnel and of rendering certain that the manuals will have the active interest and backing of those whose support is most needed to make them effective.

Material received from the operating divisions is reviewed, edited, and adapted to the particular manual in which it is to appear. Any proposed changes in its substance are first thoroughly discussed with the individual who prepared the original write-up to insure his understanding and acceptance of the changes before they are introduced into the manual draft.

Upon request, the manuals and procedures section extends its manuals service to various departments on topics reaching beyond accounting matters, as in the development, preparation, and issuance of tax, purchasing, and insurance manuals. Depending upon circumstances, the section may serve merely as publishing and distribution agency for the departments concerned or it may take over the entire manualization work from initial research to completion.

Responsibility for Completed Manuals

Regardless of point of origin of the material, the manuals and procedures section has the responsibility for final review, editing preparation for printing, and distribution of the manuals and of all subsequent revisions, as well as the maintenance of adequate files and records on them. In the case of divisional manuals—those concerned only with the special procedures of specific operating

divisions—the divisions have complete control of what goes into them, so long as there is no conflict with established policy and practice. The primary contribution of the section to such manuals is the application of its experience and technique in developing form and method of presentation and in coordinating them with the other manuals. However, the section is entirely responsible from the start for general manuals applying to the entire company.

The approximately 60 manuals administered by the section fall into the two general classifications:

1. Charts and dictionaries of accounts
   (a) General ledger accounts and major location and departmental identifying prefixes.
   (b) Cost field accounts and factory cost center prefixes.
2. Procedure manuals
   (a) Manuals of general accounting procedures only.
   (b) Manuals of divisional accounting procedures only.
   (c) Combinations of (a) and (b).
   (d) Manuals of operating procedures of the various accounting departments, such as accounts receivable, accounts payable, general ledger.
   (e) Manuals issued for other than accounting activities, such as on procedures concerning purchasing, insurance, and taxes.

Eleven Steps in Manual Preparation

Each manual is considered a specialized tool designed to meet the specific needs of the individuals for whom it is primarily intended. Although there is a basic consistency in the methods of preparation, the form of each manual is tailored to fit the conditions of its use, and each is a separate and complete unit. The established procedure for developing and preparing manuals follows definite steps:

1. Conference in which the manual subject is defined, objectives clarified, coverage and general content determined, method of use considered, and detail work assignment made.
2. Preparation of an outline giving general shape and organization to the manual. (This is especially helpful in keeping notes organized.)
3. Detail research and investigation into source material for basic data. (May be done by the manuals and procedures section, operating division personnel, or a combination of the two.)
4. Development and approval of any new or revised procedures required.
5. Organization and preparation of first written draft.
6. Conferences to review, edit, and evaluate the first draft and determine necessary changes.
7. Preparation of revised draft for review by a "cross section" of those who will use the manual.
8. Preparation of final draft, incorporating all recommended and approved changes, for publication.
9. Determination of distribution list. Publication and distribution of the manual.
10. Periodic review thereafter to insure that revisions are made as needed.
11. Preparation and distribution of all revisions.

In the accumulation of the basic data, all available sources are checked thoroughly. While this may seem an obvious requirement, the process of carrying it out is one of the most time-taking features of manuals work and the one most subject to a tendency (usually ill-advised) to short cut. There is no substitute for this step, since all subsequent work is based on it. The active interest and participation of all individuals who have the responsibility for administering the procedures covered is obtained through direct requests for suggestions and thorough discussion with them of all procedures by which they are affected. As a result of this joint effort, all who have contributed to the manual feel a proprietory interest in it and, consequently, have a personal interest in seeing that it is used.

The Circulation Lists

One condition, rigidly adhered to and applying to all manuals handled by the manuals and procedures section, is that master distribution lists and file copies of extra manual sheets must be maintained by the section. Experience has shown that this is essential to make certain that the distribution list will be kept up-to-date, that all revisions will be channelled through the section, that complete distribution of revisions is made and all outstanding manuals kept current, that answers to requests for information will be accurate, and that partial or special distributions are adequately controlled.

Master distribution lists are developed for each manual. The major emphasis here is on providing adequate coverage from the standpoint of end use. The list for each manual is separate. No two lists are necessarily alike. Periodically, questionnaires are sent to all manual holders listing the manuals charged to them and requesting them to indicate which ones they still need and what changes should be made in the distribution to them. There is included a request to return excess or unused manuals. On the basis of the information received, the master distribution lists are revised.

Manuals Must Be Kept Current

The importance of keeping manuals up-to-date and complete cannot be over-emphasized. A manual which gives only partial coverage or is not current, is worse than useless. It cannot be depended upon and it can get its user into trouble. There is no quicker way to undercut the entire manuals effort. Hence, a continued program of review, revision, and re-writing is absolutely essential. Otherwise the time, effort, and cost of installing a manuals program is completely lost.

Cost Accounting for a Research Laboratory

by JAMES A. McFADDEN, JR.

Controller, RCA Laboratories Division, Radio Corp. of America, Princeton, N. J.

Noting the growth of organized research and taking cognizance at all points of the characteristics of the research enterprise, process, and personnel, the author of this article offers and explains accounting procedures for carrying the costs of "labor", other direct charges, and burden to individual projects. Internal reporting also comes in for emphasis and illustration.

BEFORE CONSIDERING COST ACCOUNTING as related to industrial research, perhaps it would be well to inquire what the meaning of the word, research, is and of what particular concern research is to industry and government. The following two brief statements constitute significant answers to these preliminary inquiries:

1. Research in industry is commonly defined as a diligent inquiry into the scientific fields of physics, electronics, chemistry, mechanics, biology, and other related subjects. C. C. Furnas has stated that "Research, like poetry, cannot be defined in a manner that is universally acceptable. There is fairly good agreement, however, that research is the observation and study of the laws and phenomena of nature and/or the application of these findings to new devices, materials, or processes, or to the improvement of those which already exist."
2. The current concern of research to industry is evidenced by the fact that never in the short history of the United States have private interests appropriated such huge sums to be used in financing long-range research programs as now and never in the history of the world have political powers and nations placed such emphasis upon technological advancement as they do today.

The New Place of Industrial Research

Not long before World War II—a short time ago in terms of industrial history—most of the research which was done was performed in the makeshift, garret work shops of the individual fact-finders, in musty and ill-equipped laboratories at universities, and in small and little-appreciated research departments of the various leading corporations in each industry. Specific exceptions to this situation only serve to emphasize its prevalence. On the other hand, today the business of research has grown into a complex operation which consumes hundreds of millions of dollars each year. This modern research is housed in structures specifically designed to create an atmosphere conducive to constructive thinking and is equipped with the utmost in personnel, instruments, apparatus, and supplies, to assist scientists with the critical tasks facing our present troubled world

In line with this changed attitude, companies in private industry customarily

set maximum amounts they can afford to spend for research and immediately utilize these amounts in the fields of scientific endeavor in which they are most interested. Universities and colleges, instead of doling out an insignificant portion of their annual budgets to conduct a research program in connection with a few isolated problems, now launch fund-raising drives to support large, modern laboratories, staffed with the best scientific talent available for the purpose of conducting a general research program, year in and year out. Governments, in addition to constructing large publicly owned and operated laboratories throughout the world, spend millions of additional dollars in placing specific, technological problems with industrial research laboratories and with the research foundations or institutes of the universities.

A Specialty in Accounting

If it be conceded on the foregoing evidence that modern research is a big business, it is also necessary to consider that it is a different and unique business, different because many of the "tried and true" principles of ordinary cost and financial management have no place in the industrial research laboratory and unique because the finished product of research is conceived in a searching brain which has not always tarried to crystallize the various stages of the product's development.

Certainly it is not possible to say to a scientist: "Here are 'X' dollars. Within thirty days you must discover a new drug to cure cancer, invent a telescope which will employ no lenses, create an automobile to operate efficiently on water instead of gasoline, or find a cheap and plentiful substitute for uranium." Nevertheless, taking away cost and time limitations, this is exactly what is happening. Many things that we now take for granted were conceived and born in this manner. From a number of intelligent, concentrated research programs came such revelations as penicillin, television, nylon, radar, streptomycin —and atomic bombs.

The above factors and many other aspects of the day-to-day operations of an industrial research laboratory, tend to create a situation which demands custom-tailored, specialized accounting treatment. Any new industry—and particularly a new *big* industry which industrial research thus constitutes—must give considerable study to developing an accounting technique which meets two general specifications. It must measure up to the requirements of operating conditions and it must assist in reaching the goals for which the enterprise was formulated. It is in the consideration to be given to the various

EXHIBIT 1

XYZ LABORATORIES

TIME REPORT -- Month June 1950

Name Arnold A. Phinney Location West Street Section Physics

PROJECT NUMBERS	DATE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTAL HOURS	DIST. OF EARNINGS TO JOBS
Authorized Absence	4																															4	25 73
Vacation	4	8			8	8	8	8																								32	205 45
P-2003													8	8	3																	19	107 95
P-2004															5	8	8					8	8	8	2							47	267 05
P-2005																										4	8	8	8	8	8	56	306 85
TOTAL	8	4	-	-	8	8	8	8	8	-	-	8	8	8	8	8	-	-	8	8	8	8	8	8	-	-	8	8	8	8	-	176	1,000 00

NOTES: (1) LIST PROJECT NUMBERS ON SEPARATE LINES
(2) ENTER HOURS IN DAILY COLUMNS
(3) REPORT ALL TIME FOR WHICH SALARY PAYMENTS ARE MADE (INCLUDING, ILLNESS, VACATION, HOLIDAYS , ETC.)

APPROVED: RESEARCH DIRECTOR

elements of cost encountered in the daily performance of research tasks that the accountant must adopt both a philosophy and an accounting technique which may appear to be drastically different from the ordinary. Nevertheless, differences required by a specialized application of accounting cannot be considered to be deviations from sound and fundamental "common-sense" accounting theory.

The job order or project order cost system is invariably used in accounting for the cost of research. This is quite natural for, with an unknown task or

problem and a very indefinite "end product," it can be readily understood that any application of standards or an adaptation of process or unit costing is rendered impracticable, if not impossible.

Salary and Wage Distribution

Perhaps it is the view that is taken toward accounting for the "labor" element of research costs which causes the most contention and results in a veritable "eye-brow raising" on the part of the purely theoretical cost accountants sometimes found in the public accounting profession and the cost inspection services of the various procurement agencies of the Federal government, as well by the more practiced cost accountants of industrial companies who have had no experience with the management of a research laboratory as a commercial business.

The type of form employed by many industrial research laboratories to account for the time spent by scientific and technical personnel with respect to the effort applied to the various tasks or projects is illustrated by Exhibit 1. It is to be noted that each researcher is required to account for all time for which salary is paid. The distribution of salary cost, is obtained by the arithmetical processes of dividing the monthly earnings by the number of hours worked and using the quotient as the value per hour for time to be charged to each project or overhead account. As indicated by the illustration, identical costing is applied to productive time worked, holidays, illness, vacations, etc.

This method of distributing labor costs may appear, at first glance, to be an over-simplification which tends to distort what many accountants elect to term true costs. It is argued that this treatment results in a different hourly rate from month to month, depending upon the number of working days or hours in the particular month. This is, of course, a correct statement but, since it is general practice to compensate laboratory personnel on a fixed salary basis, the cost per hour *is* different when the number of working hours required fluctuates. The method is also criticized as applied to cases in which it may be necessary, because of legislation or company policy, to make overtime payments on a straight or premium time basis to salaried employees. In these cases under the cost distribution method described above, the overtime costs incurred on particular projects will be applied by use of the average rate to all work orders upon which time was spent by the personnel involved. Again it must be conceded that this is the situation but that error is not implied by it. Overtime hours are not a normal occurrence in a research laboratory and their necessity

is very seldom caused, or at least need not be, by the requirements of the project upon which the overtime is actually spent.

In challenging further these and other objections which may be offered on behalf of what are presumed to be "good" cost accounting principles, there are given below a few of the reasons why a more complicated and expensive method of recording the scientists' time and distributing the dollar cost of his effort would be of slight benefit:

1. The salary paid to a particular researcher is in no manner indicative of his productive (creative) ability. This is particularly true of the younger members of the technical staff who have not had time or opportunity to apply their intellectual efforts. It may well develop that, in the solution of a research problem, the lowest paid scientist has made the highest contribution.

2. Hours to be spent in the laboratory, upon which the employment contract of the researcher is predicated, do not take into consideration the many hours of reference reading and paper research which is invariably done on the individual's own time, by all persons who are engaged in the work of technological research.

3. Solution of a particular basic research problem may produce an answer (or answers) more widely applicable than simply to the project upon which it was developed. The element of cooperation and teamwork among research personnel has been a deciding factor in the progress made in all scientific fields, and it is only by collective intellectual effort that many research problems are solved. The studies made on one project may be instrumental in arriving at the solution to the task presented by other projects. This may eliminate the necessity of further cost in terms of additional time and effort on projects which have contributed nothing to absorption of the dollars of the direct cost of the studies concerned. Even if an attempt is made to apportion these costs beyond the project on which they were incurred, it is doubtful if any sensible evaluation could be made of the amount of benefit derived by each product assisted.

4. It is impossible to place a dollar sign on genius or to time the birth of inventions. The solution to any research problem and even the vital spark of invention, may come to the scientist when he is in the barber's chair, on the golf course, at the breakfast table, or at any other time or place.

Materials, Supplies and Other Expenses

In accounting for research, materials and supplies, along with sundry costs, are the counterpart of what are commonly considered in cost accounting as direct materials or direct charges other than for labor. Generally, this element of cost will embrace all charges incurred on projects, except salaries and applied overhead.

But for minor departures occasioned by the requirements of the general scientific field in which the particular laboratory may be interested, direct charges to research projects are usually of five types. First, there are the direct materials and supplies consisting of raw materials, finished stores and supplies purchased or requisitioned from inventories for exclusive use in the development of the project. Then, as a second classification, there are purchased models and technical services. These costs represent work in the model shops or technical service functions

of the laboratory which for any reason is fulfilled by outside craftsmen, establishments, or vendors, and the cost of which is specifically applicable to a particular project or projects. Fabrication, machining, assembly, construction, woodworking, rigging, general shop work, wiring, drafting, photography, and the like, are examples of such work and services.

Professional services, the third group, are made up of scientific or technical assistance, including consultation services, of independent professional engineers, chemists, physicists, etc. The group includes also work done or reports furnished by independent laboratories or research foundations, when required in connection with the problems of a specific project. These services are frequently needed when particular phases of a research project require knowledge in a scientific field other than the fields within the particular laboratory's general scope.

Traveling and "sojourn" expenses necessitated by a particular project, which are extensive in nature or for protracted periods of time should be applied directly to the project. This is the fourth of our five types of direct charges. It is common in connection with those projects for which it is necessary to conduct field tests or to demonstrate the results of research at distant places.

Finally, we have direct project charges for equipment, apparatus, and specialized components. These represent items of highly specialized equipment, apparatus, or components thereof that cannot be adapted to normal laboratory usage after the completion of the project or which may be dismantled for, or incorporated in, the final model or prototype. However, if equipment which might otherwise be charged to a project is developed into a pilot plant which will be used indefinitely for the production of a finished product or will produce extended commercial benefits, it may be excludible from project costs.

Overhead as Related to Research Operations

It is not expected that any member of the accounting profession will quarrel with the statement that the various ways and means of "recovering" overhead costs may be compared in number to the wives of the ancient patriarch Solomon. Although different elements of overhead expense may be applied in varying degrees of directness to the costing of a product, it is usually the case that the charge is made in relation to some common denominator such as labor dollars, labor hours, machine hours, units produced, material cost, prime cost, etc. Any variance which develops in the overhead expense allocation operation is then treated as a period cost, an inventory valuation factor, or in some cases as a reserve adjustment.

With respect to the recovery of the overhead expenses of a commercial research

laboratory, a somewhat different approach should be taken to asssure a proper and equitable allocation of overhead expenses to the various projects comprising the research program. The recovery of variances between actual and applied costs is always a problem and every possible caution must be exercised to apply the various elements of cost on a basis which will keep such variances to an absolute minimum. When all of the overhead costs of a research laboratory are not recovered against the appropriations covering the various projects, the very existence of the enterprise may be threatened. The "profit" of a research laboratory is ordinarily solely in the "know how" and experience gained by research personnel performing the tasks. Seldom is there an allowance in apropriations into which unallocated overhead may be absorbed.

Laboratories which today use the direct labor dollar ratio exclusively to apply overhead costs do so only as an expedient or because this common method is readily acceptable to public accountants and the cost inspection services of the Federal government. Certainly any accountant familiar with the operations of a long-range research program is aware of the inadequacy of this method and the inequities which will result from it if research is being conducted for more than one principal.

Research projects in a particular laboratory may range from problems which require only a chair and a table at which the scientist may work with a pencil and paper, to tasks calling for huge investments in specialized equipment, apparatus, facilities, and supporting (overhead) services. Of course, this situation may be relatively unimportant if the entire research program is financed by one interest. On the other hand, if the research program is comprised of a large number of different projects which are being performed under contract or by appropriations obtained from a number of unrelated sources, it is imperative that overhead expenses be distributed in conformity with the burden attributable to each project from an expense creation or facility utilization standpoint. The problem is minimized somewhat in the larger laboratories, the operations of which permit physical departmentalization and the adoption of an account structure which will localize overhead costs of some extent. However, the nature of research is such that it is rarely possible to confine the entire workings of a particular project to one research section or to a particular group of scientists.

Hence, what we have is a set of operating conditions which seem to call for some type of a base ratio method of allocating overhead costs to projects, along with an over-all situation which makes it important to be able to demonstrate the fairness of burden charges to projects.

Portions of Burden Distributable on Ratio Basis

The phases of any research project which embody the everyday basic research tasks in the fields of pure science and the first stages of investigation on specific problems directed to a particular answer or answers are, as a general rule, adaptable to one of the normal base ratio methods of distributing overhead. Nevertheless, as the projects progress and the problems begin to crystallize to the point where definite applications can be made of developed principles or discoveries, the demand of particular projects with respect to overhead expenditures, particularly services, will vary considerably. This fact is common knowledge among those engaged daily in the business of research but as yet is not generally recognized nor accepted by the members of the accounting profession who have only a casual acquaintance with the problem.

The answer is, in essence, not difficult. It is necessary to survey the requirements of each project, both initially and periodically as the work progresses, and to maintain the account structure in a manner which will permit: (1) an application of expenses distributable on a definite base ratio and (2) separate applications of the extraordinary expenses in various ways depending on their nature. Within the confines of the first category, a sizable portion of burden expenses can be disposed of in a routine manner by charging each project in relation to its participation.

The first category further divides itself naturally into two parts by distribution base. One section of the overhead account structure should accumulate costs which are common to every task performed in the laboratory or which are closely related to the volume of human effort. The total of this section of overhead expense should be applied, preferably, on a direct labor dollar ratio basis. Specific examples of this type of expense are:

Social security taxes.
Workmen's compensation insurance premiums.
Employee benefits.
Local travel expenses.
Equipment maintenance.
Books, subscriptions, and library expenses.
Stationery and office supplies.
Telephone and telegraph.
General and administrative expenses (including salaries).

Another distributable section of overhead cost should embrace fixed charges incident to the maintenance of the laboratory buildings, equipment, and other facilities. By allocating the total of these expenses on a floor space basis, the cost of regular facilities is more equitably applied to the various projects in relation to their actual requirements than on a labor base. In most instances only laboratory area is used as the denominator for the distribution on the premise that service facilities will be used in proportion. This is a sound assumption as

service facilities and personnel are usually provided in relation to the number of scientists and the size of their laboratories. The following are examples of building and facilities expenses:

Depreciation, amortization, and obsolescence.	Light, heat, and power.
Real and personal property taxes.	Rent.
Fire and other casualty insurance.	Building maintenance (including salaries).

The Special Problem of Extra-Ordinary Overhead

It is in the application of extraordinary charges that divergence of opinion is met. Extraordinary expenses are viewed by research management not as overhead expense but as direct charges. It is indeed unfortunate that a lack of knowledge upon the part of those responsible for the financial aspects of a research project or an entire research program, fosters a refusal to accept this principle. Individual research tasks may embody requirements the costs of which are not only impossible to estimate in advance but which may be extremely difficult to control during the term of the project. In the interest of brevity only one of the most important of these elements will be discussed, namely, patent services.

This most important part of the job of conducting the business of research is interesting from an accounting standpoint because: (1) it is not possible to identify all of the patent effort expended in connection with a particular research project as part of the cost of the patentable inventions, if any, that ensue and (2) some problems or tasks may prove very prolific with respect to patentable inventions whereas others may involve considerably more patent effort without a single patent application ever being filed or letters patent issuing.

There is no standard method of allocating these costs to projects for the very simple reason that no two research organizations, unless they are engaged in identical scientific fields, have the same problem in this respect. It is necessary to survey the operations of the particular laboratory and to determine on a percentage basis the total amount of patent service expense devoted to each phase of the patent service function. A survey of this nature presents no great problem when the staff patent attorneys are required to maintain a log or diary of their activity and time. Exhibits 2 and 3 indicate the manner in which the necessary information is gathered to obtain factors, not only for each operation of the patent service function, but to compile such factors for each field of scientific endeavor on a current experience basis.

A patent overhead expense allocation factor can usually be determined for various types of projects or by the standard patent obligations that may be imposed by the terms of the agreements covering tasks performed for each client or financial principal. The applications of these percentages to the total cost incurred

on each project will permit an adequate distribution of these expenses which may not be wholly equitable in certain instances. However, any other overhead treatment would be less satisfactory and, until such time as these costs are recognized as direct charges, this method accomplishes the best allocation of these expenses.

Any discussion of overhead expense allocation with respect to accounting for the cost of research laboratory projects would be lacking if it were not mentioned that any and all costs which are incurred specifically and entirely for a project or projects should be charged directly to such projects and only those expenses which are purely general in nature should filter into the overhead expense pool.

DISTRIBUTION:

INDIVIDUAL MONTHLY TIME REPORT

ATTORNEY_____ DATE_____ (Month / Year)

GROUP NO._____ LOCATION_____

Day	Invention and Administration	Processing of Disclosures	Prosecution: Preparation of Patent Applications	Prosecution: Amendments and R and R Requests	Prosecution: Interference Cases	Prosecution: Ex Parte Appeals	Prosecution: Final Fee Payments	Approvals: Patent Approval (Royalties)	Approvals: Publication Approval	Approvals: Contract Approval	Services: Service to Commercial Dept.	Services: Service to Engineering	Services: Service to Patent Department Operations	Services: Service to Litigation Dept.	Miscellaneous: Outside Inventor Considerations	Miscellaneous: Interference Investigations	Miscellaneous: Other Activities	Total
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	
1																			
2																			
30																			
31																			
Total																			

Form No. Pat. 2855

EXHIBIT 2

Reporting on the Cost of Research

In the presentation of costs to the researcher, the accountant must accomplish two main objectives:

1. Indicate the progress of a research project in terms of the amount of the appropriation which has been expended.
2. Indicate the expenditures in general terms or else by classes of expense which will be familiar to the scientist and which will reflect the source of the costs.

Most research projects, whether short-term or long-range, are budgeted upon the amount of money that the particular laboratory or its customer, can afford to spend. The nature of research makes it impossible in most cases to determine and appropriate a sum which will guarantee any definite or even any positive result. Therefore, in controlling "production", research management must convert the dollars appropriated into terms of hours of scientific and technical effort plus a fixed percentage for services (overhead). Material is a relatively small

DISTRIBUTION:

DOMESTIC PATENT OPERATIONS TIME REPORT

FOR THE { Month / Year to Date

DATE _____ Month Year

	GROUPS	PHYSICS	CHEMISTRY	METALLURGY	CERAMICS	TOTAL
	Supervision and Administration					
	Processing of Disclosures					
PROSECUTION	Preparation of Patent Applications					
	Amendments and P & A Requests					
	Interference Cases					
	Ex Parte Appeals					
	Final Fee Payments					
APPROVAL	Patent Approval (Apparatus)					
	Publication Approval					
	Contract Approval					
SERVICING	Service to Commercial Department					
	Service to Engineers					
	Service to Foreign Patent Operations					
	Service to Litigation Department					
MISCELLANEOUS	Outside Invention Considerations					
	Infringement Investigations					
	Other Activities					
	TOTAL HOURS FOR PERIOD					
	% TIME SPENT ON PREPARATION APPLICATIONS					
	AVERAGE HOURS PER APPLICATION					
	APPLICATIONS FILED					

FORM NO. PAT 3057

EXHIBIT 3

and unimportant factor in research costs and in any event, cannot be sensibly budgeted.

Keeping research management's interpretation of the figures in mind, the accountant must present the dollars of research cost in a manner that will enable

XYZ LABORATORIES
RESEARCH DEPARTMENT SUMMARY OF RESEARCH PROJECTS
PERIOD ENDED JUNE 30, 1950

PROJECT OR SHOP ORDER NUMBER	DESCRIPTION	TOTALS						TO DATE							
		THIS MONTH		TO DATE		APPROPRIATION		MATERIAL		SALARIES & WAGES Research		SALARIES & WAGES TechServices		OVERHEAD	
		$		$		$		$		$		$		$	
	CHEMISTRY														
0-1200	Organic Materials	6	665	12	740	75	700	215		5	680	582		6	263
0-1201	Corrosion of Metals	5	368	11	693	20	300	459		3	350	2	267	5	617
0-1202	Metal Alloys		419		604	1	000	13			269	26			296
0-1213	Luminescent Materials	2	023	16	351	17	000	571		5	767	2	123	7	890
0-1217	Solid State Phenomena		557	2	455	4	450	-		1	221		6	1	228
0-1218	Physical Chemistry of Materials	55	430	263	058	500	000	22	720	72	809	47	360	120	169
	Total Chemistry Research	70	462	306	901	618	450	23	978	89	096	52	364	141	463
	PHYSICS														
P-2001	Optics		556	105	913	327	310	14	422	20	525	21	523	49	443
P-2002	Nucleonics			2	579	4	500		297		169		868	1	245
P-2003	Electron Emission	2	089	38	988	82	527		641	14	732	2	658	20	917
P-2004	Photo Electric Devices		588	40	784	140	000	1	377	11	363	6	549	21	495
P-2005	Colorimetry	5	191	16	030	65	777	1	270	6	112		597	8	051
	Total Physics Research	8	424	204	294	620	114	18	007	52	901	32	235	101	151
	Total Research Expense	78	886	511	195	1 238	564	41	985	141	997	84	599	242	614

EXHIBIT 4

the scientist to compare the results attained with those expected. Here the matter of terminology becomes important. If the comparison is unfavorable, the cost statements must indicate in the scientist's language, the element of effort which has proven more costly than was originally estimated. Such terms as "direct" or "indirect" labor, materials, or burden and terms like "laboratory" overhead or "general and administrative overhead," have no place in the cost statements of a research laboratory. Elements of cost classified under such captions as "scientific salaries," "engineering salaries," or "technical service salaries," "materials and supplies," and "overhead", are understood by research personnel and are readily accepted by them.

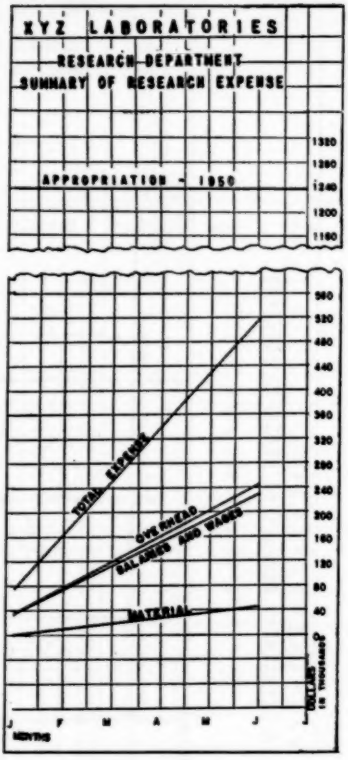

EXHIBIT 5

"Overhead costs" should never be emphasized as the ordinary research worker invariably considers this as an additional cost per hour of scientific salaries and feels that control of the dollars of salaries spent on each research project will necessarily control the element of overhead expense. While this supposition is not well-founded, most research directors, nevertheless, will attempt to remove the emphasis from the overhead factor and, in some instances, provisions for overhead costs are not considered nor included in the appproprations made to the research department for specific research projects.

Of utmost importance in the presentation of costs to research personnel, is the avoidance of detailed and meticulous arithmetical accuracy made so obvious in most financial and operating statistics. While the average scientist will go to infinity when probing into a research task, in cost control he becomes bored to the point that he will not even peruse cost statements which are expressed beyond the nearest dollar. In some instances, where the magnitude of a project permits, even the nearest hundred or thousand dollars is sufficient for the purposes of the

researcher and research management. This being the case, the accountant will engender better feelings in his relationship with the research organization and will command much more respect for his work and his department if he recognizes this and prepares cost statements accordingly.

The best manner to accomplish the objective of figure simplicity is to carry the details necessary for other corporate purposes in the working papers and to recopy the information in condensed form to the statements which are published

XYZ LABORATORIES

RESEARCH DEPARTMENT - Chemistry SUMMARY OF EXPENSES

PHYSICAL CHEMISTRY OF MATERIALS- PERIOD ENDED JUNE 30, 1950

Dr. I. M. Retina
RESEARCH DIRECTOR

0-1218
PROJECT NUMBER

MONTHS	TOTALS		TO DATE			
	TOTAL COST	APPROPRIATION	MATERIAL	SALARIES & WAGES Research	SALARIES & WAGES Tech. Services	OVERHEAD
	$	$	$	$	$	$
January	29 280	30 000	2 529	8 104	5 271	13 376
February	34 640	35 000	2 992	9 588	6 237	15 824
Year to Date	63 920	65 000	5 521	17 692	11 508	29 200
March	39 129	40 000	3 389	10 830	7 045	17 875
Year to Date	103 049	105 000	8 901	28 522	18 553	47 075
April	49 677	50 000	4 290	13 750	8 944	22 693
Year to Date	152 726	155 000	13 191	42 272	27 497	69 768
May	54 902	55 000	4 742	15 196	9 884	25 080
Year to Date	207 628	210 000	17 933	57 468	37 381	94 848
June	55 430	60 000	4 787	15 341	9 979	25 321
Year to Date	263 058	270 000	22 720	72 809	47 360	120 169
July		50 000				
Year to Date		320 000				
August		50 000				
Year to Date		370 000				
September		45 000				
Year to Date		415 000				
October		40 000				
Year to Date		455 000				
November		30 000				
Year to Date		485 000				
December		15 000				
Total		500 000				

EXHIBIT 6

and distributed internally. Most research personnel and even research management like and understand slide rule computations and information presented in graphic form. With this in mind, the controller or chief cost accountant of a commercial research laboratory or of a company having a large research department, should strive to present costs of "slide rule" accuracy and, if possible or necessary, in graphic form.

Four Informative Reports

The final exhibits accompanying this paper illustrate cost statements designed not only to interest the scientist but to place in his hands cost information which he can understand and use intelligently:

1. A cost summary on a current month and year-to-date basis, expressed in numerical characters, of all the projects embodied in the research is embodied in Exhibit 4.
2. Summary of the same year-to-date costs and appropriations, expressed in chart or graphic form is presented in Exhibit 5. This information is of much importance when it is considered that research program appropriations are normally budgeted on an annual basis. The data afforded by Exhibits 4 and 5 can be placed on opposite sides of a single sheet of paper and will serve as a complete, concise top management report. It is usually desirable to exercise close control over the number of copies of this information, as distribution is intended only for the research director and other members of the laboratory's management. The individual scientists directly responsible for the project tasks are very sensitive with respect to amounts appropriated for projects other than those for which they are responsible. Therefore, care must be exercised to make sure that they are not exposed to such information.
3. Exhibit 6 presents to the individual scientist, in chronological sequence, the various costs incurred on a particular project for which he is responsible. Amounts for each element of expense are shown for the month and year-to-date. The report renders the historical record of the expenditures always available for the purpose of checking the progress of the work with respect to the time estimates originally projected and also to control the effort in the event that the appropriation is being exhausted too rapidly (in view of the results attained) or too slowly (due to improper scheduling of personnel).
4. Exactly the same information as is given by the foregoing report is included in Exhibit 7, except that the cost elements are charted and, ordinarily, this form of presentation is more easily grasped and absorbed by the scientific mind.

At this point, the task of preparing the cost statements under methods here advocated may have been made to appear to require an extensive clerical force. This certainly would be the case if the research program represented hundreds of different projects. However, it has been proven in actual practice, that to present cost information in this manner requires less time and attention than with the conventional formal cost statements. Most of the statements proposed are adaptable for duplicating purposes to either preprinted master forms or, in some systems, to master forms themselves made through a duplicating process. These forms are kept in the files of the cost department and each month the current information is typed or drawn on the form or reflected through a registration procedure, and the required number of copies are run. The masters are then returned to the files for future use.

Any of the accepted duplicating systems can produce the desired result whether the preprinting and/or registration method is employed. Duplicating from a master eliminates the retyping each month of the descriptive data for each project, the captions for the cost element, and other repetitive information.

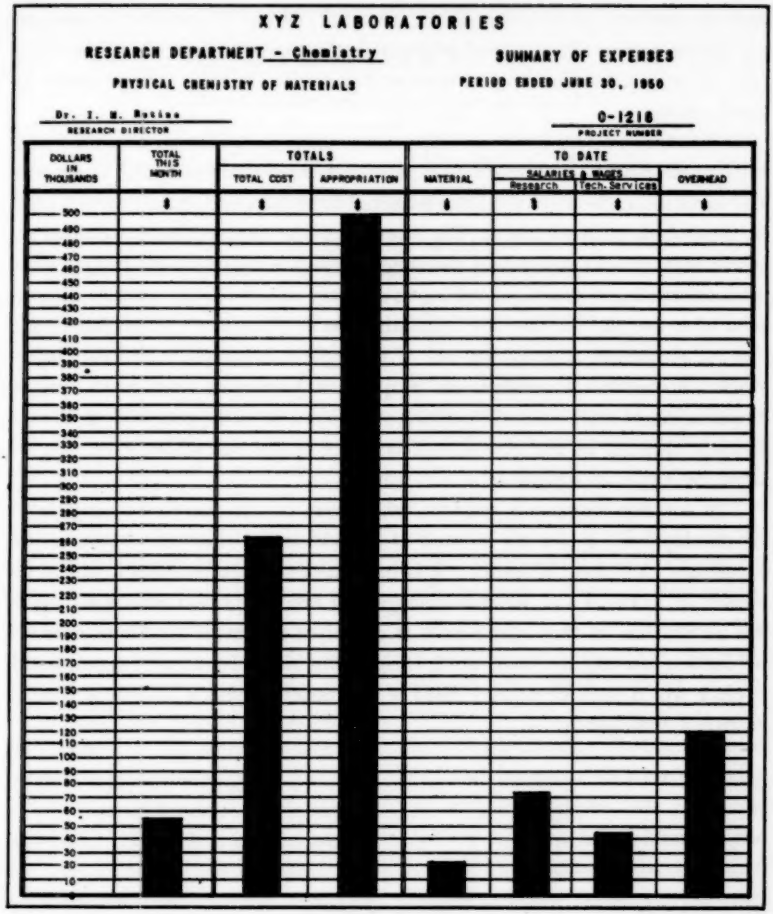

EXHIBIT 7

The Accountant in Research Management

The staff, i.e., the work force, of the large research laboratory is ordinarily composed of a carefully selected group, or groups, of persons who may be nationally or even internationally outstanding in the particular field of scientific endeavor. Moreover, the otherwise undistinguished researcher will hold, at least, a bachelor of science degree and quite often a large percentage of personnel will

have masters' and doctors' degrees. It can readily be understood that the accountant cannot employ the same philosophy in dealing with this type of business associate as he could if the business were manufacturing, mining, transportation, or retail selling.

If it is further considered that industrial research is rapidly drawing even with the foregoing fields in the number of personnel engaged and in dollars of expense and investment, the importance of the special techniques and attitudes which must be developed, becomes plain. The accountant who attempts, to force upon research management at any level the same approach as may properly be applied to a manufacturing operation is making as serious a mistake as the research director who takes the position that cost accounting has no place in a research laboratory. But the accountant must do his job. If he neglects to compile accounting information necessary for management purposes, valuation of fixed assets, proper presentation of financial and operating statements, or to support billings to contracting agencies of the government or other clients for whom work may be done, he is open to equally valid criticism.

The new big business of research, which even now is only in the early stages of development, is gravely in need of the assistance which the well-qualified accountant can offer. Therefore, it is imperative that the accountant add to his wealth of financial and business management knowledge and understanding of the peculiarities of this unique field of organized endeavor. In this manner the accountant can take the place which is rightfully his in the research organization, a place which must be capably filled if the modern research laboratory is to be managed intelligently.

THE WORKSHOP

Procedures and Forms for Control in Tool and Die Production

by LEON E. WELLS

Cost Accountant, A-B Stoves Co., Battle Creek, Mich.

A METAL FABRICATION PLANT rises or falls on its tools and dies, their design, cost and efficient use. Our hypothetical company, the Acme Stamping Company, was such a plant and was faced with such a problem. This small company engaged in the manufacture of varied products and required the use of several hundred dies, jigs, fixtures and templates. These tools were made in the company's own tool room, which also produced tooling for other companies on a job shop basis.

As with many other small companies, the growth of the operations of the Acme Stamping Company far outstripped the application of management techniques. Much information needed for proper control and operation was not available, particularly in regard to tooling. Accordingly, it was planned to set up a proper control of tool and die costs. Three questions were recognized as requiring answer and suggesting a logical sequence of steps.

(1) What information do we need?
(2) What will facilitate the shop handling of tools?
(3) What accounting routine and forms will be required?

Information Required

With respect to the first and, so to speak, "target" question, it was determined that the needs of four groups for information must be satisfied. The production department needed data on the availability of dies for a particular job, their location in the plant and the presses which could handle the die for each operation. The engineers needed a list of dies by part number, showing the operation and function of dies available for use, when working on improvements or in developing new models. The purchasing department needed perpetual inventory data on tool steel and supplies and the rate of usage, together with means of knowing the possibilities for quantity purchases and discounts. The accounting department required tool and die detail and operating information for plant valuations, insurance values, job cost control, and departmental expense control and budgeting.

Facilitation of Shop Handling

Yet our initial action was not angled directly to contriving a system for pro-

TOOL ROOM JOB TICKET

Date Issued March 10, 1949			Date Completed March 23,1949		No. 203
Job Type	New Die	Die Rep. X	Mach. Rep.	Misc.	Outside

Type of Machine — Mach. No.

Part Model & Name Model 50-EM Top Support — Part No. EM-3394

Blue Print No. EM-3394-B — Authorized EMS — Date March 10, 1949

INSTRUCTIONS Change radius on two front corners on the first forming die.
(2) Remodel corner oscillating die for same part.

MATERIAL

Quan.	Die Set & No.		$	
2 Pcs	Ketos 1 x 3-1/2 x 3-1/2	.686 Lbs @ .47 per Lb		.32
2 Pcs	Ketos 2-1/2 x 4 x 4	1.912 Lbs @ .47 per Lb		.90
		TOTAL	$ 1	22

EXHIBIT 1

viding flow of the above information. We moved rather in response to the second point, the facilitation of shop handling of tools as basic to both efficient operations and adequate information. Therefore, it was decided that our first step would be to set up a system of proper tool identification and positive location. As there had been no accurate record of the tooling or its value, the task of setting up this initial record and evaluating it was given to an outside appraisal company.

Each die was numbered and labeled to show the part number, part name, and operation performed. An oval brass tag bearing this die number and the company name, was affixed to each die on the front edge of the die shoe and to each jig and template on the front of the frame, so that the location of markings were uniform. The die number assigned was, in each case, the tool room job ticket number prefixed with numerals for the year in which the tool was made. Thus a die made in 1949 on job ticket number 102 would be number 49-102. Through this identification, it became a simple matter to refer to the job ticket in our files and find all details of cost and manufacture of any particular item.

Further to facilitate production, steel storage racks were constructed adjacent to the presses on which the dies would be used. The arrangement was designed to permit handling of the dies between racks and presses with fork trucks. Each rack was labelled alphabetically and the individual locations on a rack were stenciled in front in each case with the number of the die to be stored there. Every departmental foreman was given a list of all tooling within his department, showing the location and the number of each item.

To tie this systematic storing method to operating needs, all production order forms used throughout the factory, which list each operation in sequence, were made to show the die number, die location, die function and the machines on which the die could be used. Upon completion of each work order, the die was required to be returned to its section of the storage rack. If the die was in the tool room for remodeling or repair, a small metal sign was adopted to be fastened in place at the die rack, stating this fact. The use of these die storage racks in conjunction with die numbers has saved thousands of dollars in time which would otherwise be lost in looking for dies and in making certain that the right die was secured for the particular job.

Forms for Control

It was in the establishment of controls to govern the operation of this shop system set up to facilitate and lower the cost of production through the proper handling of tools and dies, that the forms required to operate the system came under attention. These were designed to tie in with the current accounting system. Ledger accounts were set up for the new tool and die inventory, as well as expense accounts to give top management the information desired. The accounting department was partly reorganized to eliminate duplication of effort and the overlapping of detail. A "central control" was founded to handle the clerical duties of production control and material and inventory control, the supervisor working directly under the chief cost accountant. Through this arrangement, all of

LABOR

DATE	NAME	HRS.	$		DATE	NAME	HRS.	$	
3/10/49	Brown	8	14	80					
3/10/49	Danis	4	7	40					
3/10/49	Smith	3	5	55					
3/11/49	Brown	8	14	80					
3/11/49	Danis	8	14	80					

EXHIBIT 2

DAILY TIME TICKET

D. C. Wooden Co., Kalamazoo, Michigan

NAME JOSEPH D. BROWN CLOCK NO. 2

DATE Feb. 6, 1950 HOURS WORKED 9 DEPT. A

		ELAP. TIME	PART NUMBER	OPER. NO.	PIECES	PIECE RATE	WAGES INDIRECT	WAGES DIRECT
12:00	STOP							
7:00	START	5	Job 413	10		1.85	9.25	
12:30	STOP							
12:00	START	1/2	LUNCH					
3:00	STOP							
12:30	START	2½	Job 413	10		1.85	4.63	
4:30	STOP							
3:00	START	1½	Job 364	90	Dept 0	1.85	2.77	
	STOP							
	START				TOTAL		16.65	
	STOP							
	START							
	STOP							
	START		O.K. by LEW					
	STOP							

EXHIBIT 3

the information on tools, dies, and jigs became readily available to management.

The Job Ticket

Even as the proper tools and dies are needed for good production, so are well-designed forms and their routing important in maintaining control. The Tool Room Job Ticket (Exhibit 1) initiates the control. It is prepared in duplicate by the engineering department as authorization for each new job. Each set of tickets is pre-numbered in sequence. This is the number previously referred to, which will be stamped on the brass tag fastened to the finished die. The engineers enter on the ticket the date issued, job type, part number

and name, blue print number and any special instruction to the tool room foreman.

The ticket then goes to the works manager for approval. If approved, it is forwarded to the tool room foreman who retains the original for use in the tool room and sends the duplicate copy to the cost department. The foreman of the tool room lists all die sets and materials used in making the die. Upon completion of the die, he enters the date, checks his material listing and then sends the original copy of the ticket to the cost department where the materials are priced and extended. The foreman's original is then clipped to the cost department copy.

The front of the tool room job ticket now shows all material for the job and the cost of this material. A recapitulation of all completed job tickets for the month gives the total material charged to completed tools and credited to tool material inventories. Each job ticket also serves as an automatic requisition against material inventories for entry on perpetual inventory records.

Labor Control

The reverse of the ticket (Exhibit 2) lists the hours and labor dollars spent on each job. A summary of labor totals for the month will give the amount of labor to charge to the finished tool account and will show in process labor on all unfinished jobs. The cost department posts labor daily to the reverse of its copy of the ticket.

"DAILY TOOL ROOM BREAKDOWN" — DATE May 2nd, 1950

NAME	NUM	DEP	JOB	WORK ON NEW DIES FOR AGIE 10	DIE AND TOOL RE-MODEL OR REBUILD 15	WORK ON NEW DIE FOR OUTSIDE CO. 20	REPAIR WORK ON DIES FOR AGIE 30	REPAIR DIES FOR OUTSIDE CO. 40	WORK FOR MAINT. DEPT. 50	DIE MAIN. FOR AGIE 60	DIE MAINT FOR OUT. 70	MACH. WORK FOR OUTSIDE CO. 80	WORK ON TOOLS, JIGS & FIXTURES 90	MISC. WORK 100	TOTAL $
Smith	5		401	9.25											18.50
	3		399	5.55											
Brown	8		400	14.80											14.80
Thomas J.	8		406			14.80									14.80
TOTALS	64			88.80		14.80	3.70			1.85			9.25		118.40
FOR MONTH	128			183.15		29.60	9.25		1.85	1.85			11.10		236.80

EXHIBIT 4

The basis of labor charges to jobs is the employee's Daily Time Ticket (Exhibit 3). This form is prepared daily for each man in the tool room by the timekeeper and is certified at the end of the day by the foreman. It shows the elapsed time on each job, the job number and operation number. It is a "snap-out" form in duplicate. After extension by the payroll department, the copies are separated. The original is filed by date in the payroll department and the employee's copy is

MONTH February 1950

TOOL ROOM MONTHLY LABOR REPORT

		CURRENT MONTH		PREVIOUS MONTH	
	OPER NO	TOTAL $	TOTAL %	TOTAL $	TOTAL %
Work on New Dies for Acme	10	1,177.07	50.01	1,972.12	72.08
Die & Tool Remodel or Rebuild	15	431.05	18.31	368.14	13.45
Work on New Dies for Outside Company	20				
Repair Work on Dies for Acme	30	217.38	9.24	146.16	5.34
Repair Work on Dies, Outside Co.	40				
Work done for Maintenance Department	50	11.10	.47	45.32	1.66
Die Maintenance (Grind Etc.) - Acme	60	154.47	6.56	85.09	3.11
Die Maintenance for Outside Company	70				
Machine Work for Outside Company	80				
Work on Tools, Jigs & Fixtures -Acme	90	362.60	15.41	98.05	3.58
Miscellaneous Tool Room Labor	100			21.26	.78
TOTALS		$ 2,353.67	100.00	$2,736.14	100.00

	CURRENT MO.	PREVIOUS MONTH	INCREASE	DECREASE
Number of Men on Department Payroll	9	9	0	0
Standard Hours for the Month	1564	1557	7	
Actual Hours for the Month	1272-1/4	1479		206-3/4
Manhours Lost through Absenteeism	* 291-3/4	78	213-3/4	
Percent of Absenteeism	18.65%	5.01%		

* 1 Manexcused this month
1 Man sick for 14 days

DISTRIBUTION

_____Works Manager
_____Controller
_____Tool Room Foreman
_____General Accounting
_____Cost Department
_____Press Room Foreman
_____Machine Shop Foremen
_____Maintenance Foreman

EXHIBIT 5

forwarded to the cost department for the labor posting. When this posting is completed, the employee's copy is given to him through his foreman as a receipt for his day's work.

The Daily Tool Room Breakdown (Exhibit 4) serves as a recapitulation of the labor taken from the daily time ticket and as a budget control, duplicate copies being sent to interested de-

partment heads. The various operation numbers and descriptions form the columns heading. The name of each worker appears in the extreme left hand column. Hours worked on each job number show next and then the labor value, posted under the proper operation and totaled for each man in the final right hand column. The footings

wonder, for example, why production of new dies did not meet expectations, this form on the sample figures given shows that Operation 10 New Die, was down and Operation 30 Repair Work, was high, in cost. A check back to the daily tool room breakdown shows the day, department, and workman involved. The reader of the report may

MONTH February

"MONTHLY DEPARTMENTAL BREAKDOWN"

SUPPLEMENT

	OPER	DEPT B	DEPT C	DEPT D	DEPT G	DEPT H	DEPT S	DEPT CX	DEPT P	TOTAL
Work on New Dies for Outside Company	20									
Repair Work on Dies For Acme	30		175.75				41.63			217.38
Repair Work on Dies for Outside Company	40									
Work Done for Acme Maintenance Department	50						11.10			11.10
Die Maintenance (Grind, Etc.) for Acme	60		148.92				5.55			154.47
Die Maintenance For Outside Company	70									
Machine Work For Outside Company	80									
Work on Tools, Jigs and Fixtures	90	9.25	71.22	83.25			195.18	1.85	1.85	362.60
Miscellaneous Work	100									
TOTAL $		9.25	395.89	83.25			253.46	1.85	1.85	$ 745.55

EXHIBIT 6

of the columns are carried in daily and month-to-date totals.

The latter figures are posted to the Tool Room Monthly Labor Report (Exhibit 5) which provides the busy executive, at a glance, with comparative figures for the current and the previous month, as well as an analysis of tool room labor dollar cost. Should he also note that absenteeism was high.

The Monthly Departmental Breakdown Supplement (Exhibit 6) may be regarded as optional, depending on the desires of top management. Its purpose is to provide a further analysis of the repair labor and miscellaneous labor charges shown on the monthly labor report, by a breakdown to the depart-

1	Danly Co.	4	
2		5	
3		6	

ORDER NO.	DATE	QUANTITY ORDERED	QUANTITY RECEIVED	VEN	PRICE	UNIT	DISC.	INV. DATE	AMT. INVOICE		FRT. & EXP.	UNIT COST
○	5-2	100										
620	6-4		100	1	56.90	Ea	-	6-4	569	00	PP	56.90

CONSUMPTION		
No.	19	19
J		
F		
M		
A		
M		
N		
D		
T		
Max.		
Min.		

DESCRIPTION	ACCT. NO.	UNIT	STD. PRICE
○ DIE SET - Cat. No. 1509 Size 15 x 9	620	Ea	56.90

Source Card

EXHIBIT 7

ments responsible, to disclose situations which might otherwise be overlooked or might be hidden by a foreman trying to cover carelessness on the part of one of his men.

Material Control

The foregoing forms provide for labor control. For the control of material, additional forms are needed. The Source Card (Exhibit 7) serves a dual purpose. It is designed to provide the central control unit already spoken of with data for guidance in purchasing supplies by giving a list of previous vendors, prices, discounts, turnover, and high and low inventory limits. It is also used for pricing material as listed by the tool room foreman on the

DATE	RECEIVED		ISSUED		ACTUAL BALANCE ON HAND	AVAILABLE BALANCE ON HAND	DATE	RECEIVED		ISSUED		ACTUAL BALANCE ON HAND	AVAILABLE BALANCE ON HAND
	REC. RPT. NUMBER	QUANTITY	PROD.ORD. NUMBER	QUANTITY				REC. RPT. NUMBER	QUANTITY	PROD.ORD. NUMBER	QUANTITY		
○													

PART NO.	PART NAME												UNIT	STD. COST	LOCATION
	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.			
○															

Form 4949

Perpetual Inventory Card

EXHIBIT 8

job ticket. The Perpetual Inventory Card (Exhibit 8) is the same as is used for purchased materials throughout the plant. It is filed in relationship to the corresponding source card and shows at a glance the amounts on hand in stock bins and racks.

The Production Order (Exhibit 9), in addition to being an order to perform work on a given quantity of items, is of additional vital importance to the foremen and die-settters. It is re-produced on a spirit duplicator and a copy sent to each department involved in the production of a part. A large binder is maintained in each department, with these forms filed by part number. The orders are then further sorted by starting dates, laid out in the sequence in which they are to be run, and filed in folders by the machine group in which the work falls. The dies setters are thus able to plan their work ahead, as each die number and its location is shown for each operation. Upon completion of a job, each die is checked. The last piece run is placed with the die and is inspected by the departmental inspector, the foreman and the die-setter to determine whether the die is fit for further operation or whether it should be sent to the tool room for repair. By following this routine, dies are kept ready at all times and the maintenance cost is lowered.

PRODUCTION ORDER

ORDER NO.

CASTER NO.		DESCRIPTION				PART NO.											
64831		Top Support				EM-3394											
BASIC ORD.	SIZE ORDER	MODEL			DRWG. NO.			BY	SHEET OF								REVISED DATE
1000	5/2	50-EM			EM-3394E				1 of 1								3/23/49
BALANCE	SIZE STOCK	OPN.	502	401	405												
	5/5	OPN.	290	300	310												
BACK LOAD	SIZE FINISH	DEPT.	F														
	5/6	DEPT.															
		OPN.	.24	.30	.56												
		DEPT.	CK	D	D												

QUANTITY		MATERIAL NO.	DESCRIPTION OF MATERIAL	PCS. OUT	DEL. TO DEPT.
TOTAL	UNIT				
		124	18 Ga. 22-1/2 x 24"		

WORK CENTER	OPER.	OPERATION DESCRIPTION	TOOLING
502	290	Shear from 45 x 120 (5 cut) Machine No. 5	
401	300	Pierce (2) 5/16" Holes, 1 set, 2 hits	5/16" Punch and Die
405	310	Form on Die, 1 set, 1 hit Horn Press D-96	Die No. 49-236 - Rack "A"
		After Inspection:	
		Truck to Assembly Line 27, Dept. J	

EXHIBIT 9

The Die Notice (Exhibit 10) is also

NEW DIE NO._____

DIE NOTICE

DATE_____

FROM: Engineering Department

TO : ( ) Works Manager ( ) Press Room Foreman ( ) Purchasing Dept.
( ) Asst. Superintendent ( ) Production Dept. ( ) Central Control
( ) Experimental Dept. ( ) General Accounting ( ) _____
( ) Tool Room Foreman ( ) Cost Department
( ) Ch ief Inspector ( ) Tin Shop Foreman ( ) _____
( ) Stock Expeditor ( ) Machine Shop Foremen

PURPOSE: (1) To keep all concerned, of any new dies completed by our Tool Room and any dies placed on order or completed for outside firms.

(2) Also to inform you when a current die or jig is sent to the Tool Room for repairs, and again when it is returned to its home department.

( ) New Die Started by our Tool Room

( ) New Die Completed by our Tool Room

( ) New Die Ordered by Outside Firm

( ) New Die Completed for Outside Firm

( ) Current Die or Jig sent to Tool Room for Repairs

( ) Repairs on Die or Jog Completed and returned to Home Department

Date Die Started or Ordered_____

Date New Die Completed_____

Date Die or Jig sent to Tool Room for Repairs_____

Date Die or Jig returned from Tool Room after Repairs_____

PART NO._____PART NAME_____

OPER. NO._____DIE FUNCTION_____

REMARKS:_____

_____

_____

EXHIBIT 10

a duplicator form. Its purpose is to advise all department heads concerned when new dies are authorized for construction, when dies are sent to the tool room for repairs, when they are returned to their home department after repair, and then general availability.

Completed Cost Record

The job ticket with completed tool room copy clipped to the cost department labor copy, becomes the permanent cost record. The material items, listed by the tool room foreman, are priced from the source card. The application

of the burden factor to the labor figure completes the total die cost. At the end of the month, a summary is made of the costs of dies made for Acme and those for outside firms. On jobs remaining in process at the end of the month or fiscal year, a line is drawn under the last item of material posted on the tool room copy and under the last labor item on the cost department copy. The extensions, summarized, become the total of tools and dies in process.

Economy the Goal

The project described, by which tool and die expense has been brought under control, was the result of an extensive cost reduction program. The highly competitive field of the Acme Stamping Company's operations has made it necesssary to seek every means of reducing and controlling operating costs. As tools and dies form a large part of the capital investment and their depreciation and obsolescence make up a great portion of operating expense, the methods of tool control devised have been very effective in achieving this further goal.

Also by listing all current tooling on visual records so that all department heads can study and familiarize themselves with the processes and routings, a wealth of knowledge and experience has been imparted. This is just another example of the truth that the training of "the man who makes the money" is the big point in cost control. New tools have been designed which have helped to improve methods, safety factors, runing time and overall costs. As an end result, product quality has improved and a better sales position gained.

COMING ARTICLES IN THE **NACA BULLETIN**, APRIL 1951

More Informative Costs on the Income Statement
by EDWARD E. RENNHACK

Economy Studies in Replacement Decisions
by THOMAS W. LELAND

The Science and the Art of Distribution Costing
by JOHN A. BECKETT

Distribution Cost Control—And Beyond
by E. W. KELLEY

Ten Qualifications of a Plant Controller
by DONALD F. LINCOLN

The Task of the Time and Production Reporting Staff
by FRANK O. CALL

Performance Reports for a Tabulating Unit
by L. S. LEWAN

Production Control in a Small Foundry
by WINSTON BROOKE

THE COST FORUM

CAPITAL RECOVERY ON HISTORICAL COST DESTROYS PRODUCTIVITY

Editor, N. A. C. A. Bulletin:

I HAVE READ WITH CONSIDERABLE INTEREST William F. Crum's discussion of historical cost depreciation versus replacement cost depreciation, which appeared in the November 1950 BULLETIN but find his conclusion to be entirely unrealistic. While his basic premise that "replacement is reinvestment" is undoubtedly sound, the fact that each replacement is in effect a new venture to be considered on its own merits does not lead to the conclusion that recovery of the capital initially provided should be limited to historical dollar cost.

On the contrary if, in the face of rising prices (clearly the long-term trend), business generally subscribed to the philosophy that its responsibilities were fully discharged by simply recovering capital investment as measured by historical cost, a great disservice would be done to the investors concerned and to the American people as a whole. We cannot escape the fact that replacement of facilities is impossible if the capital recovered and available for reinvestment is inadequate. It would follow that productive capacity for useful goods and services would be severely impaired and our standard of living would suffer commensurately.

Proponents of historical cost as the basis for capital recovery evidently fail to recognize that dollars have no meaning except as a medium of exchange at any given time. Prices charged for goods and services are presumed to cover (1) costs of production and distribution, (2) recovery of capital invested, and (3) a fair profit. This premise is generally accepted as proper by all reasonable persons, although there may be considerable difference of opinion as to what constitutes a fair profit. Moreover, it is generally accepted that prices must, of necessity, increase as production and distribution costs increase, assuming that the higher costs cannot be offset or compromised by cost-saving installations and procedures or through absorption by reducing profit percentages.

However, when considering capital recovery, which obviously must precede reinvestment for replacement or any other purpose, many persons modify their acceptance of the right to recovery by limiting it to a fixed dollar amount. Thus, while readily accepting higher costs attached directly to current production and distribution operations, they disregard the effect of higher costs on the purchasing power of capital.

There can be little, if any, satisfaction from earning a fair profit if such profit must be used, regardless of the degree, to make up the deficit in the purchasing power of the capital recovered. To the extent that profits must make up any such deficit, a real loss has been sustained and indicated profits are correspondingly lower. If capital recovered on an historical basis will buy only three lathes, whereas it initially was sufficient to provide four, the loss is just as real as if one lathe had been destroyed before attainment of its productive life.

In my opinion, the remainder figure appearing on any statement of revenues and expenses is not profit as long as any por-

tion of it cannot be paid out without impairing the productivity of the business. Possibly the situation can be illustrated better by considering a nonprofit organization. It invests the capital available to it in productive assets and commences operations. In order to stay in business on a continuing basis, its operations must generate sufficient revenue to cover current expenses and replacement of facilities.

Obviously, its revenues must be increased proportionately to compensate for higher costs of replacing facilities or it will face liquidation. These additional funds must be recovered currently and it is reasonable to expect the customers who acquire the production from the depreciating equipment (i.e., those who are creating the liability for replacement) to pay the higher cost. If this is not done, the nonprofit organization can replace its facilities only by borrowing additional funds. In that event, customers acquiring the production of the new facilities would find the cost to them would contemplate both (1) the higher cost of the new facilities and (2) repayment of the funds borrowed.

In actual fact, prices have reflected the higher replacement costs, although there may be a serious question as to whether or not the price increases have been adequate, because of political and other influences. For the reason that accounting recognizes only depreciation on historical cost, the added income consisting of recovery of capital purchasing power has been reflected as profit. There have been at least three very serious results. First, these so-called profits have been subject to income taxes. This has constituted a tax on capital, whereas the sixteenth amendment to the constitution authorizes a tax on income only. Second, shareholders and proprietors have been penalized. Third, industry generally has become the target of much unfair criticism as to apparent profits to the extent that the free enterprise system as a whole has been jeopardized.

In my opinion, industrial and professional accountants as a body have failed in a serious way by not having devised a basis for recognizing the depreciation of capital which has been occurring. Obviously, it is not an easy problem but an acceptable procedure should be found. Because of international developments, we are faced with higher tax rates and further inflation. The problem may well be more acute in the future than it has been in the past.

MAX LORIMORE, *Los Angeles Chapter*

BETTER ACCOUNTING INFORMATION FOR INSURANCE BUYERS

Editor, N. A. C. A. Bulletin:

AT THE RECENT AMERICAN MANAGEMENT ASSOCIATION insurance conference, insurance buyers who are responsible for maintaining proper coverage for their companies made some criticism of accountants and accounting methods with respect to information furnished for use in determining amounts of insurance to be placed. The three main points of criticism were as follows:

1. The accountant too often fails to record all values in inventories, due to the lag in recording after the actual receipt of the material. An investigation revealed that some accounting departments are as much as five days behind in recording after the receipt of material.
2. Pricing methods, such as first-in first-out, standard cost, and last-in first-out gives incorrect values for insurance purposes.
3. The accountant is negligent in informing the insurance buyer as to what is included in the values reported. The buyer is not certain that all inventories, furniture, and fixtures and other assets are included in the value figures.

We feel that we have been able to overcome these objections in our company so

that the insurance buyer is confident that the figures furnished him by the accounting department reflect the insurable values suitable for adequate insurance coverage. Our stockhandling section, which is responsible for maintaining the detailed perpetual inventory records, is so organized and staffed that receipts and issues of materials are reflected in the records on the following business day. If the material arrives ahead of the invoice, the receiving report is the source of information for bringing the material on the inventory records at standard cost. A memo card to match the material and invoice is made up to show that the material has been picked up on the records awaiting receipt of the invoice. When the invoice does come in, the corresponding memo card is stapled to it and the invoice processed for payment. When invoice arrives ahead of the material, it is held pending the receipt of the material to be evidenced by the receiving report. This plan keeps the inventory records current at all times.

With respect to inventory pricing methods, likewise, the points made by the insurance buyers are well taken. Our plan is to carry the bulk of our material at standard cost. We make sure that the standard and actual costs are substantially the same or we adjust our standard costs to actual where the differences are substantial. The result is that we are able to report our inventories at the correct insurable values. This is particularly important at present, due to the price increases in some materials.

The third objection is overcome by furnishing the insurance buyers with a short report on the various classes of items included in the total value to be insured. We show these principal headings:

Raw material inventories.
Work in process.
Finished goods.
Furniture and fixtures.
Machinery and equipment.
Buildings (insurable amounts only).

Fixed assets — machinery, equipment, and building—are valued from appraisal figures revised yearly and further adjusted to show purchases and disposals since the most recent revision.

The accountant can be of greater service to his company if he keeps these three important points in mind when providing figures to be used in determining values for insurance coverage.

JOHN B. McMULLEN, *Des Moines Chapter*

PAYROLL DEDUCTION PROCEDURE FOR SAVINGS BONDS

Editor, N. A. C. A. Bulletin:

NOW THAT OUR COUNTRY is again engaged in what can only be designated as warfare, once more enormous expenditures for the armed forces are being planned. To finance these, it is likely to become necessary for the government to renew its call upon the people to help support this program through the purchase of savings bonds by payroll reductions. In meeting this payroll problem effectively from the individual company viewpoint, a simplified system of controlling payroll deductions becomes a necessity.

One plan is to order blank bonds from the bank on a consignment basis and to pay the bank for them as they are turned over to the employees. The employees sign payroll deduction authorization cards, including all the pertinent information, and these are kept in the personnel department. The personnel department turns the information over to the printing department for the purpose of making an addressograph plate containing all the information necessary for inscribing bonds as purchases are completed. After the plate is checked for accuracy, it is sent to the payroll clerk who is to hold it in his file.

When payroll deductions accumulated for an employee week by week aggregate enough to purchase a bond the payroll clerk withdraws the addressograph plate and sends it back to the printing department where the bond is inscribed. The plates are marked in one corner with a dot of paint which signifies the denomination of bond involved (say, red for $25, yellow for $50, etc.). At the same time the payroll clerk prepares a tally sheet of the number of bonds of each denomination which have become fully paid for during the current payroll period. This tally sheet acts as a disbursement authority for the blank bond custodian, who then releases the number of bonds indicated on the tally sheet to the printing department for proper inscription.

After the bonds are printed, they are returned to the blank bond custodian who checks them for accuracy. They then are mailed to the employees. The blank bond custodian relieves his inventory by the amount of bonds printed and prepares the necessary information as to the amount of money owed to the bank for bonds printed and sends this information to the disbursement cashier who prepares the check and forwards it to the bank.

The addressograph plates come to the printing department directly from the payroll department, whereas the blank bonds come from the blank bond custodian. In this way a good internal check is maintained on the number and denomination of bonds completed by the printing department.

GEORGE D. BURDON, *Scranton Chapter*

OPERATION OF A SALVAGE STORES DEPARTMENT

Editor, N. A. C. A. Bulletin:

I HAVE READ WITH INTEREST the article on setting-up a salvage stores department, written by Perry L. Kimmell and appearing in the October 1950 BULLETIN. As further comment upon the value of setting up such a department, I wish to submit the following information on one procedure which goes somewhat beyond the consideration of machinery and maintenance parts declared idle.

We have established a salvage stores account to which we charge all machinery and equipment rendered idle, surplus machinery parts, and also packaging materials such as bottles, boxes, cartons and corrugated boxes together with crude drugs and chemicals which have been declared obsolete for further use in manufacturing operations. Included likewise are waste by-products in continuous process departments, which have a potential value when mixed with animal feeds and fertilizer. The foregoing classifications are charged to the stores account at the cost value carried in the original stores.

The operation of the salvage stores department, which consists of finding a use or a buyer for the material at a fair value, is under a single individual. It is the duty of this employee to contact the various outlets for all these types of items in order to obtain the best price possible for those not listed in the open market. A complete description card is written up and transfer is made of material to a specific location where it is held until disposition is made. Occasionally it is possible to dispose of material in other parts of the plant. For example, boxes may be used in the shipping department as containers for packaging small shipments. If this is done, the material is transferred from the stores account to the department using it, at the cost shown on the books. Full value is recorded as realized in these cases.

A department number is assigned for the accumulation of operating expenses incident to the handling of salvage material.

The expenses are compiled under the following captions: wages, salaries, miscellaneous repairs, miscellaneous expense, fixed charges and prorated overhead charges. Also, a merchandise loss account is used for the gain or loss in the transaction in material sold. For example, if waste paper scrap is sold, the salvage stores account is credited with the value received. If the item salvaged is sold for less than cost value, the difference is charged to the merchandise loss account. Thus, at the end of of each month, the net loss is reflected on the books as well as the cost of handling operations. Through tabulation of the dollar value sold, an indication of the percentage of loss in ratio of the dollar value of material handled is obtained.

In most instances, we are able to realize a greater salvage value than by our previous method, that of handling the salvage of material through the various purchasing agents responsible for handling purchase of the items. They necessarily treated salvage as somewhat of a side line.

OLIVER R. ALTUM, *Indianapolis Chapter*

RESPONSIBILITY FOR PROFIT IMPROVEMENT

Editor, N. A. C. A. Bulletin:

MR. CHARLES H. GLEASON'S ARTICLE, "An Organized Profit Improvement Program," in the October 1950 issue of the BULLETIN outlines very clearly the various fields where cost reductions (or profit improvement) may be made. It is not clear how far he recommends going in entrusting this assignment to staff personnel, but it is our opinion that best results can be achieved if the work is made the full responsibility of those in regular responsible positions in management.

What more important project is there than cost reduction and maintenance of efficiency in operation? Is this not why industry employs capable men in executive positions? Who but the chief engineer is responsible for the designing of a quality product to be manufactured at a competitive price? Is it not part of the chief procurement officer's every day duty to purchase quality materials at the best possible prices from dependable sources?

If we create a surplus organization staffed by individuals whose sole responsibility is the reduction of costs, we are relieving someone of responsibility in our regular organization. This shift of responsibility will retard rather than expedite progress. Cost reduction can best be achieved through established channels with the prime responsibility resting on a hard hitting general manager. His subordinates know that they are expected to, and must, show progress. They must plan and execute profit saving programs and assist related divisions in the pursuit of common objectives.

This thinking is perhaps not inconsistent with Mr. Gleason's recommendations if he places responsibility for results upon the operating organization. The present letter is written merely as a word of caution that, in a field so vital as cost reduction and profit improvement, we cannot solve the related problems by passing them along to someone in an advisory capacity. The solution takes day-in and day-out concentration on the part of those who occupy the key positions in the management picture.

W. A. HOLT, *Evansville Chapter*